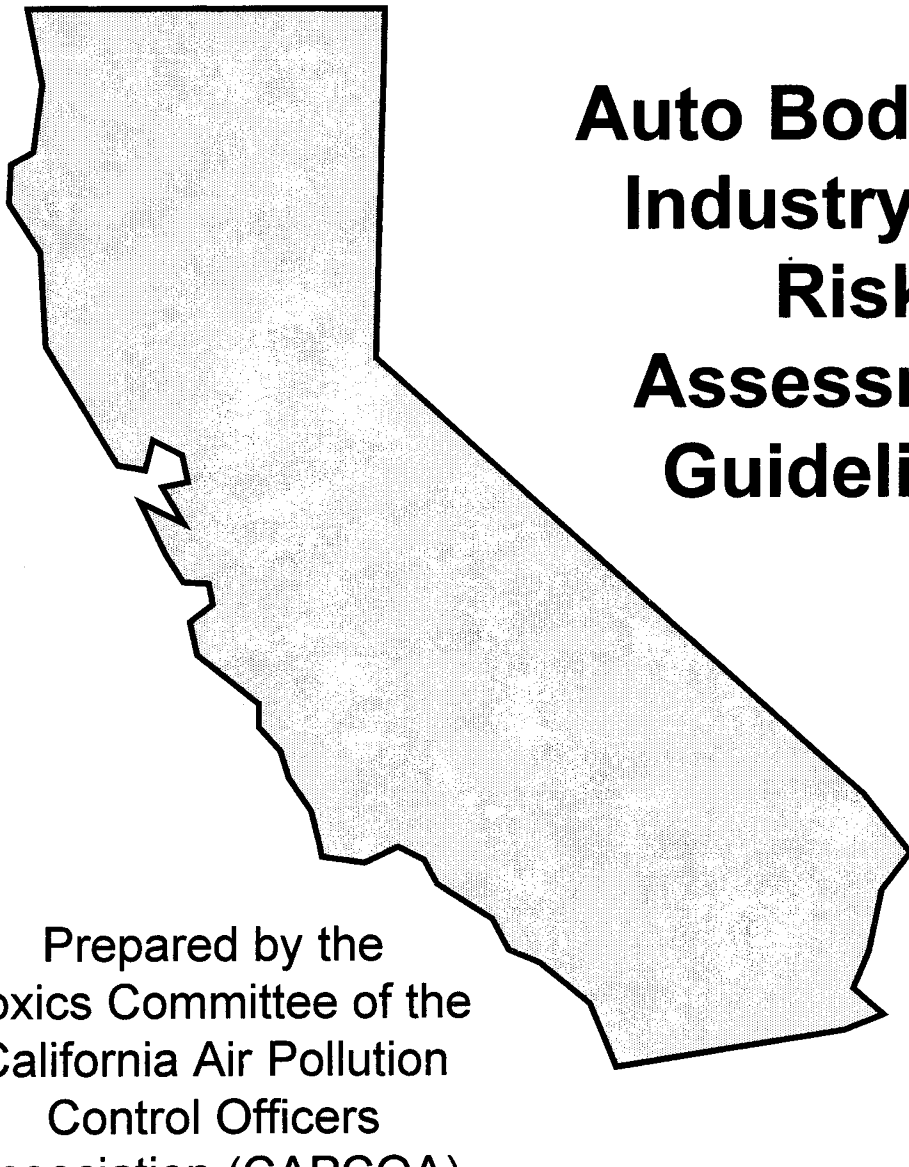
CAPCOA

Air Toxics "Hot Spots" Program



Auto Bodyshop Industrywide Risk Assessment Guidelines

Prepared by the
Toxics Committee of the
California Air Pollution
Control Officers
Association (CAPCOA)
September 1996

California Air Pollution Control Officers Association (CAPCOA)

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Approved by

The Board
of the
California Air Pollution Control Officers Association
on
September 26, 1996

Auto Bodyshop Task Force

Ray Asregadoo	California Air Resources Board
Richard Bode	California Air Resources Board
Janette Brooks	California Air Resources Board
Jim Collins	Office of Environmental Health Hazard Assessment
David Craft	Monterey Bay Unified APCD
Randy Frazier	Bay Area AQMD
Greg Harris	California Air Resources Board
Susan Kaiser	California Air Resources Board
Janis Lackey	California Air Resources Board
Carolyn Lozo	California Air Resources Board
Joe Petrini	Santa Barbara County APCD
Cliff Popejoy	California Air Resources Board
Tom Roemer, Chairman	San Luis Obispo County APCD
Debbie Ryan	San Diego County APCD
Tony Servin	California Air Resources Board
Terri Thomas	Ventura County APCD
Mark Watkins	California Air Resources Board
Dodie Weiner	California Air Resources Board

September 1996

AB 2588
INDUSTRYWIDE AIR TOXICS EMISSION INVENTORY AND HEALTH RISK ASSESSMENT FOR AUTOMOTIVE SURFACE COATING

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1.0 Executive Summary

1.1 Approach

Auto bodyshops (bodyshops) are subject to reporting under the Air Toxics "Hot Spots" Information and Assessment Act of 1987. Bodyshops are considered industrywide sources which requires that air districts prepare the toxics emissions inventory and health risk assessment, as needed.

Auto bodyshops differ from other industrywide categories like gas stations and drycleaners because the emissions are more complex and variable. However, release parameters for the most part can be effectively modeled.

The industrywide inventory and health risk assessment guideline addresses toxic emissions from coating applications and associated processes. Emissions from activities such as body repair work were assumed to be negligible. Emissions estimates and impacts from auto bodyshops are a function of:

- coating composition
- coating consumption
- coating profiles
- application method
- air pollution controls
- dispersion modeling

1.2 Coating Composition

Coatings have two basic parts: solids, to coat the vehicle; and solvents, to carry the solids.

Both solids and solvents content may vary with:

- Coating type (primer, topcoat, etc.),
- Coating manufacturers,
- Color (Some colors contain more toxic metals).

1.3 Coating Consumption

The guidelines address the consumption rate of coatings and solvents for individual shops by providing a model survey form to be sent to bodyshops. The survey requests information about the consumption of various coating products and solvents as a function of manufacturer. Additional data about application methods, booths and filters, and stack parameters are requested for emission calculations and modeling.

1.4 Coating Profiles

To reduce the effort required to collect individual toxic emissions inventories, CARB surveyed coating manufacturers on the generic composition of their products according to product type (primer, topcoat, etc.). The survey requested sales volume percent of products in California. The results were used to develop "generic" coating profiles, which are sales weighted average compositions by product type for each manufacturer. Using throughput data for each type of product consumed in an individual bodyshop, an estimate of the toxic emissions can be developed.

Use of the generic profiles will overestimate emissions from some shops and underestimate others for the survey year. However, emissions from bodyshops can vary from year to year, so the method outlined in the guidelines should result in a reasonable estimate of average emissions over time.

1.5 Application Method

The application method of a coating affects the transfer efficiency and the resulting emissions of solids. All solvent was assumed to be emitted. The type of spray gun influences the transfer efficiency. Since coating solids may contain highly toxic compounds, such as hexavalent chromium, assumptions concerning transfer efficiency and fall out fraction can be critical to health risk assessment results. Data from the U.S. EPA and a recent study on aerospace coating application efficiency were used to develop recommended transfer efficiency and fall out fraction values for the assessment.

1.6 Air Pollution Controls

Most auto body coating is done in spray booths with filtration systems to control the emissions of solids. The industrywide assessment includes recommended values for efficiencies of commonly used spray booth filters. Painting cars without a spray booth and filters may result in high solids emissions and potentially significant health impacts.

1.7 Dispersion Modeling

Dispersion modeling was addressed for three basic release types:

- Unobstructed stack,
- Stack with a rain cap or similar vertical obstruction,
- Fugitive - Painting with no booth or dedicated exhaust system

Within these basic release types, several combinations of representative stack parameters (height, diameter, flow rate) were modeled. Building downwash was considered. Several sets of meteorological data were used in the dispersion modeling, including screening data and actual meteorological data from two different locations (San Diego - coastal and inland).

The guidelines include dispersion modeling results in the form of tables and graphs of relative dispersion (X/Q) for each release scenario and each meteorological data set examined at various distances from the facility. These tables can be used to estimate the toxic impact from a facility.

1.8 Use of Guidelines

The guidelines provide a mechanism and procedure to survey local auto bodyshops and develop a toxic emissions inventory based simply on coating and solvent throughput. Using the decision tree procedures contained within the guideline, a priority score and an estimate of the health risk can be determined, if needed. If the screening risk assessment indicates that the source may pose a significant health risk, the guidelines suggest that a refined risk assessment using site specific release data, meteorological data, and emissions information be performed.

The guidelines include an example inventory and health risk assessment and blank forms that can be used as a format for performing an industrywide assessment.

2.0 Introduction

2.1 The Air Toxics "Hot Spots" Program

The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (Act, AB 2588) was adopted by the California Legislature in response to public concern about airborne releases of toxic chemicals. AB 2588 was enacted to gather information and assess the effects of routine or predictable toxic air emissions on public health. Facility owners subject to the Act must produce a comprehensive inventory of routine releases from a list of hundreds of toxic compounds. Based on the inventory results, some facility owners are required to perform health risk assessments that evaluate the toxic impact these emissions might have on the health of people who live or work around the facility. Under AB 2588, the public is required to be notified of significant health risks resulting from emissions from nearby facilities. AB 2588 was amended in 1993 by SB 1731, Facility Toxic Air Contaminant Risk Reduction Audit and Plan, to require that significant health risks discovered through the program be reduced.

Under specified circumstances, state law requires local air districts to prepare toxic emissions inventories and health risk assessments for certain classes of businesses. These classes of businesses are referred to as "industrywide" facilities.

Industrywide inventories are required if: (1) a class of similar facilities (as determined by their SIC code) subject to AB 2588 is composed primarily of small businesses; (2) individual compliance would impose a severe financial hardship; and (3) emissions from the facilities can be easily and generically quantified. Auto bodyshops constitute such an industrywide group.

2.2 Document Preparation

This document was prepared by the Auto Bodyshop Task Force (ABTF) to assist local air districts in assessing emissions from auto bodyshops. The task force was formed at the direction of the CAPCOA Toxics Committee. The eighteen member ABTF was made up of representatives from six air districts, the California Air Resources Board (CARB), and the Office of Environmental Health Hazard Assessment (OEHHA). The goal of the ABTF was to generate a set of guidelines to assist local air districts in developing generic toxic emissions inventories and health risk assessments for automotive coating operations.

To this end, the ABTF met over a two year period to formalize a methodology for quantifying and assessing the impacts of toxic emissions from automotive coating operations. This document provides step by step procedures showing how to collect the necessary information from body shops, use this information to calculate a generic emissions inventory, develop a risk ranking or facility prioritization, and submit the results in an appropriate format to the CARB.

These guidelines are not regulatory and are only advisory. Each District is responsible for its own compliance with the Act.

2.3 Limits and Scope of Guidelines

These guidelines only cover industrywide air toxic emissions inventories and health risk assessments for automotive and mobile equipment refinishing. This category includes automobile dealerships where body and paint work is performed, but it does not cover coating operations associated with automobile manufacturing. The assessment only covers coating and associated emissions. Operations such as sanding, fiberglassing, and use of body filler are not believed to be significant sources of air toxics emissions and are not included.

Emissions of both solid and volatile toxics can be controlled using add-on control equipment. Organic emissions may be controlled by carbon adsorption or incineration.

Use of this type of control equipment is very rare in the automotive surface coating industry, and is not addressed. Facilities with add-on controls should be evaluated individually. Equipment, such as dry filters, that controls particulate emissions is commonly used and is addressed.

The industrywide inventory and risk assessment described in this document consists of the following general steps: facility identification and surveying, generic emission quantification, determination of basic facility configuration, facility prioritization, dispersion modeling, health risk assessment, and submittal of inventory data to the CARB. Not all of these steps are necessary for all facilities. For example, a health risk assessment is not necessary for a facility that is not high priority. Likewise, a refined inventory and health risk assessment is not necessary if the scoping risk assessment indicates that the health risk from the facility is not "significant", as defined by the air District. Facilities which, as a result of this process, are identified as "significant risk facilities" may (at the discretion of the District) opt to perform a site-specific risk assessment with more precise data related to their site.

These Guidelines provide a brief overview of the automotive bodyshop industry and include a glossary of terms commonly used in risk assessment and the coating industry (see Appendix A). Appendix B provides a flow chart or decision tree for evaluating a source. The Guidelines follow the course of the flow chart and include examples to clarify how the emissions inventory is generated and how facility emissions are prioritized, assigned a risk, and reported to the CARB. It next provides a description of how volatile and particulate emissions can be estimated using information provided in the facility survey and from "generic" coating composition data provided by the CARB. This is followed by sections on facility prioritization, "generic" dispersion modeling, and the "scoping" health risk assessment. The results of the ABTF's sample health risk assessment are presented and discussed.

3.0 Description of Industry

In order to complete an industrywide inventory and health risk assessment, an understanding of how a bodyshop operates may be helpful. Most auto bodyshops operate as job shops. That is, they paint single vehicles for individual customers. Many are small businesses. The materials they use will vary depending on specific job requirements. To account for these variations, generic formulations were developed for each category of product and for each manufacturer. The generic formulations represent the chemical constituents of the most commonly found products that are sold in California.

VOC and particulate emissions are generated during most phases of repairing an automotive surface which includes vehicle preparation, coating application, and equipment cleanup. Vehicle preparation may start with the repair or replacement of the metal and plastic components (body work). Extensive effort is then put into preparing and cleaning the plastic or metal surface to be refinished to ensure proper adhesion of the coating and the appearance of color uniformity. Emissions from this step, except solvent and cleaner use, are not expected to be significant and are not considered in this evaluation.

A key ingredient to a quality coating job is surface preparation and cleanliness. After repair, the surface undergoes several cleaning, sanding, and coating steps. Surface preparation is generally performed in two stages. First, the surface is washed thoroughly with a detergent and water to remove dirt and surface contaminants. Then the surface is cleaned with a high VOC solvent to remove wax, grease, and other contaminants. The area to be refinished is then sanded to smooth or remove the old finish and may be given a final solvent wipe to remove fingerprints and the like.

After the surface has been sanded and cleaned, it is treated with an undercoat or primer. Primers provide corrosion resistance, fill in surface imperfections, and provide a bond for the topcoat. There are four basic types of undercoats: precoat, primer surfacer, primer sealer, and primer.

The primary function of a precoat is to maintain a thin barrier between a metal surface and a subsequent waterborne primer to avoid pinpoint corrosion. It is not intended for use to fill scratches. Precoats provide adhesion to the surface and produce a corrosion resistant foundation. Precoats are generally followed by a primer surfacer.

A primer surfacer is a high solids primer providing adhesion, corrosion protection, and build. The solids fill in small imperfections in the substrate. This surface is usually sanded after application to provide a uniform surface for the topcoat.

A primer-sealer improves adhesion of the topcoat and provides a seal between the primer and the topcoat to prevent solvent penetration. Sealing is also necessary to promote topcoat adhesion when a topcoat with a different formula is used on top of another incompatible coating. This step is necessary for adhesion to plastic.

A primer is a general term used to describe a product that is a bond coating used to prepare a surface to successfully accept and hold subsequent finish coats. Their purpose is to provide maximum adhesion and a corrosion resistant foundation. Waterborne primers are an alternative to the conventional solvent-borne primers and offer the advantages of higher filling and sealing capability, but may require longer drying time. In addition, waterborne primers are impervious to attack by solvents. They prevent sand scratches from swelling in the old surface through solvent penetration by a solvent-borne primer or topcoat.

Topcoats are generally applied as a series of coats over a primer and determine the final color of the finished area. Since most repairs are spot and panel repairs, a major concern is matching the original equipment manufacturer (OEM) color as closely as possible by blending the repair into the surrounding area. In some cases a heavily reduced blend coat is used to further improve the color match. As OEM topcoats have become more complex, the precise matching of original colors by refinishers has become more difficult, and in many cases, has resulted in increased solvent usage to achieve color blending.

Topcoats come in single coat, two coat (basecoat/clearcoat) systems including solid colors or metallics, and multi-stage systems. Metallic finishes differ from solid color finishes because they contain small metal flakes suspended in a mixture of binders, solvent, and pigment. These finishes are among the most difficult to color match.

Presently, most of the European, Japanese, and U.S. automotive manufacturers are using high solid basecoat/clearcoat finishes on their vehicles. Two coat and multistage systems are commonly found in the automotive refinishing industry. The system utilizes either an acrylic lacquer or a polyurethane clear coat over a base color (or an acrylic enamel color basecoat with an acrylic urethane clearcoat). Low VOC waterborne clearcoats are now in use and are important when refinishing with a metallic finish. The two coat or multistage system can reduce overall emissions by allowing a high quality and higher VOC basecoat to be used in conjunction with a lower VOC content clearcoat.

4.0 Emission Estimation

Some factors that influence the magnitude of emissions and, subsequently, the health impact include the specific coatings used, application methods, the use of or lack of a spray booth, and the type of booth controls. This section describes how a generic toxic emissions inventory can be developed for the typical bodyshop.

4.1 Emitted Compounds and Generic Formulations

There are now over 700 toxic compounds listed under AB 2588. In an effort to simplify data collection, twenty of these toxics were determined by the ABTF and CARB to be the most likely constituents to be found in automotive coatings in potentially significant amounts. A listing of these compounds and their toxicity values is included as Appendix C.

The composition of coatings and associated products varies widely between product type, manufacturer, and color. Therefore, the ABTF adopted categories for typical coatings used in many VOC limit rules for automotive coating operations. Using the list of most likely constituents and the categories of coatings and solvents, the CARB contacted the major manufacturers of coatings sold in California through the cooperation of the National Paint and Coating Manufacturers Association. The manufacturers included BASF, DuPont, Nason, PPG, Sherwin Williams, and AKZO. According to the Association, this accounted for over 95% of the coatings sold in California. The CARB developed a coating manufacturer survey form that requested product formulations and relative sales information for all products sold in California containing these components in amounts greater than 1%. An example of a manufacturer's survey questionnaire is in Appendix D. The generic formulation data is available to districts on diskette from CARB.

From the manufacturers' data, the CARB generated generic coating formulations. The listing of the coating types and generic profiles, along with a description of their development are contained in Appendix E. As coating compositions vary over time, the data was collected for formulations representing coatings supplied before and after the implementation of automobile coating operation rules on January 1, 1995.

From the generic formulations, a toxic emission inventory can be developed for a bodyshop knowing the brand of products used and the number of gallons of each product used during the inventory year. To complete the toxic emissions inventory, it is only necessary to survey local bodyshops using a simple form, and process the data using simplified equations to estimate emissions.

4.2 Resources for Developing a List of Bodyshops

The most readily available resource of local bodyshops is the phone book. Most bodyshops advertise in the yellow pages. Additionally, names and addresses can be obtained from local distributors of coatings and solvents. Finally, there may be a chapter of an industrial organization such as the California Autobody Association (CAA). This and similar organizations can be very helpful in locating local bodyshops. They can provide a forum to contact and inform members about the Air Toxics "Hot Spots" program. Additionally, they can provide a mechanism to assist members in completing the survey form described in the next section.

4.3 The Bodyshop Survey Form

To assist air districts in collecting the data necessary to generate a toxic emissions inventory, the ABTF developed a survey form and a suggested cover letter to send to local bodyshops. The form is located in Appendix F.

The FACILITY INFORMATION section is self explanatory. A source may not be aware of or not be assigned a facility identification (Fac ID). A permit to operate may not have been issued. The sources can be instructed to leave these blank.

The data requested in the EQUIPMENT INFORMATION is required to complete the emission calculations and is used as input into the dispersion calculation. Most of the requested responses are self evident. Building dimensions can be best estimates. If the booth is not heated, the exhaust temperature can be assumed to be the average ambient temperature. If a booth is used, it is important to know whether or not a raincap is used on a stack and the blower capacity of the fan motor. These parameters determine the amount of or lack of plume rise. This will be discussed further in the section on dispersion modeling. A technical data sheet describing the filtering efficiency of the type of filters used in the booth should be carefully reviewed. The filter supplier can provide this information. A review of filter data by the ABTF indicated that filter efficiencies varied greatly between foam and paper filters.

Toxic emissions are calculated using the data supplied on the reverse side of the survey. It is important for the bodyshop owner or operator to fill out a separate form for each brand of coating. For example, if DuPont and AKZO products are used, a COATING AND SOLVENT USAGE INFORMATION form should be filled out for both DuPont products and AKZO products. This is done because the generic formulations for these two manufacturers are not identical. If the bodyshop owner or operator is not sure which coating category a specific product should be placed in, the regional distributor of that product has that information. Company representatives are usually informed on state VOC limit rules. Blanks were left in the solvent entries to include the VOC content of the solvents used.

As a quality assurance check, ensure that the total gallons of solvent and coating listed at the top of the form equals the total at the bottom. Additionally, if the gallons of material that goes to hazardous waste is not known but is desired to be included, some districts use a default value between 0-5%.

4.4 Emission Calculations

By using the generic coatings information from CARB and the amounts of these coatings used by a bodyshop, generic toxic emissions can be calculated. The compounds addressed in this assessment are divided into two groups: volatile and solid.

4.4.1 VOC Calculations

All volatile compounds contained in coating products are assumed to be emitted through evaporation. Volatile compounds are generally solvents. The amount of a volatile toxic compound emitted is equal to the amount of the compound contained in the product used. They are not reduced in concentration by most filters but pass through and can be described by the following equation:

Equation 1: $E_v = (V_p - (W_p \times V_p)) \times D \times X_c$

Where:

E_v = Emissions of volatile compound, lb/yr or lb/hr
V_p = Volume of product used, gal/yr or gal/hr
W_p = Amount of product shipped off site as hazardous waste, %/100
D = Density of product, lb/gal
X_c = Mass fraction of volatile compound in product, %/100

For example, to calculate the emissions of toluene, the bodyshop survey form would be reviewed and all categories containing toluene would be listed. Next, the number of gallons of each category used would be recorded, corrected for any materials sent off site as hazardous waste. The CARB generic formulation would then be consulted to determine the most likely mass fraction of toluene found in that category for that manufacturer. If a manufacturer is not included in the survey, the material safety data sheets for the individual products should be consulted.

Generic toluene emissions would then be estimated by multiplying the gallons used per year of each category in which toluene was a constituent by the density of the product and by the mass fraction toluene for that category and manufacturer, as estimated by the CARB. This process would be repeated for each constituent and category to develop the organic emissions component of the toxic emissions inventory. The total toluene is the sum of the contributions from each category. The process is readily completed using a spreadsheet format.

For example, for an uncontrolled source using 47 gallons of product with a density of 7.28 lb/gal and a toluene content of 11.9%, the mass of toluene generated from that product during the emissions year, less that which goes to hazardous waste, would be:

$$\begin{aligned} E_v &= (47 - (5/100 \times 47)) \times 7.28 \times 11.9/100 \\ &= 39 \text{ lb/yr} \end{aligned}$$

4.4.2 Particulate Emission Calculations

Emissions of solids are influenced by transfer efficiency, capture efficiency, and control efficiency. Solids consist of polymers, pigments, and other materials that are deposited on the vehicle. Unlike volatile compounds, the amount of solid compound emitted is much less than the amount of the compound contained in the material coated. Depending on the type of spray gun, a portion of the solid component deposits on the part. The remainder is lost as overspray. Depending on the level of control, all or a portion of the overspray is emitted to the atmosphere as particulate matter emissions. Before these emissions can be calculated, a number of these parameters must be considered.

4.4.3 Transfer Efficiency

Automotive surface coating is generally performed using a spray gun. Transfer efficiency is a measure of the effectiveness of spray equipment in applying the solids to the intended surface. The transfer efficiency depends on the type of spray gun, the target configuration and size, the temperature and humidity of the shop air, paint characteristics, paint and air flow rates, and operator experience. Both the South Coast AQMD and U.S. EPA have developed a test protocol for determining transfer efficiency, but currently there is no universally accepted test protocol.

The most prevalent types of auto refinishing spray techniques used in California are air atomized conventional and high volume low pressure (HVLP) spray guns. The ABTF recommends the use of the values listed in Table 1, below, which are from U.S. EPA, Reduction of Volatile Organic Compound Emissions from Automobile Refinishing, EPA-450/3-88-009, October, 1988. If site specific values are available, they can be used instead of the values below.

Table 1
Transfer Efficiencies for Coating Applications

Application Method	Transfer Efficiency
Hand (brushes, rollers, etc,)	100%
Conventional (air atomized) spray gun	35%
High volume, low pressure spray gun (HVLP)	65%

4.4.4 Capture Efficiency

For many sources, automotive surface coating is done in a spray booth equipped with filters or a water curtain which captures most of the solids not deposited on the vehicle and adjacent surfaces. Booths are usually equipped with an exhaust fan (for safety) and particulate control. In an enclosed booth or an open booth with an exhaust rate sufficient to comply with fire codes, the capture efficiency is virtually 100%, and all emissions can be assumed to pass through the filters or water curtains.

For partially enclosed spray booths, the capture efficiency might be lower. It is up to the air District to estimate the capture efficiency of partially enclosed booths. If a prep station or an enclosure other than a spray booth is used, the capture efficiency is less than 100%. The exhaust fan is not sufficient to draw all of the solids to the particulate control system. Some of the solids are emitted through the exhaust stack and the remainder are emitted as fugitives. If coating is done outside a spray booth or prep station, emissions are uncontrolled. The capture efficiency is 0.

4.4.5 Fall Out Fraction

Another parameter, fall out fraction (FOF), must be considered when estimating particulate emissions and is closely associated to both the transfer efficiency and whether or not a spray booth is used. Recent studies of a coating operation at Rohr Industries, an aerospace manufacturing facility in San Diego, have shown that not all of the solids that do not stick on the surface of the substrate being sprayed are drawn into a particulate control system. A portion of the solids fall to the floor; cling to the painter, walls, and ceilings; and are deposited on other surfaces such as racks or masked areas. The FOF is the percent of solids sprayed including the amount transferred to the substrate of interest that does not reach the particulate removal system.

For example, the Rohr study determined that the fall out fraction for medium-sized components coated in a precleaned, fully enclosed spray booth by an experienced painter using HVLP spray equipment was 91%. That means for every 100 pounds of solids sprayed, only 9% goes to the filtering system and 91% falls out prior to the filters including the amount that sticks to the intended surface (i.e., the transferred portion).

The ABTF recommends that a fall out fraction for auto bodyshops be set at 80% for HVLP and 50% for air atomized spray operations conducted in a fully enclosed booth. The fall out fraction includes the transfer efficiency. The fall out fraction should not be used for spray operations conducted in partially enclosed booths, prep stations, or outside of a booth. Instead use the transfer efficiency. This equates to 65% for HVLP and 35% for air atomized spray operations. The rationale for this approach is summarized in the memo located in Appendix G.

4.4.6 Booth Control Efficiency

Control efficiency refers to the effectiveness of a prep station's or spray booth's particulate emissions control system in removing particulate materials. It can be the filtering efficiency of a filter or mat, or the scrubbing efficiency of a water curtain. Information on the control efficiency of the spray booth or prep station particulate controls can usually be obtained from the manufacturer or supplier of the equipment. If information is not available, the ABTF recommends that the values listed in Table 2 be used. These values are based on informal surveys of filtering efficiency values according to manufacturer's specification used in spray booths located in ABTF member districts. Because this is a scoping evaluation, it is assumed that all particulate emissions have a diameter of less than 10 microns. For a more detailed analysis, the particle distribution should be considered to determine the fraction of the particulate emission that are respirable. This may involve source testing stack emissions to determine particle size distributions.

Table 2
Control Efficiencies for Coating Applications

Particulate Control Equipment	Control Efficiency
Paper Filters	95%
Rigid Foam (baffle) Filters	70%
Water Curtain	90%

4.4.7 Fractional Portion of Toxic Compound

Toxic compounds are expected to dissociate in human cells, and therefore, only the toxic fraction of each particular compound should be considered. For example, the molecular formula for lead chromate is $PbCrO_4$ and the contributing atomic weights of each element are:

lead = 207
chromium = 52
oxygen = 16 x 4 = 64

The total formula weight of lead chromate is 207 + 52 + (4 x 16) = 323.

The fractions of each elemental constituent is equal to the contributing atomic weight of that constituent divided by the compound formula weight. Therefore, the toxic fractional weights are as follows:

lead = 207/323 = 0.64
chromium = 52/323 = 0.16

Toxic constituent amounts in commonly applied pigments are listed below:

Table 3
Toxic Metals in Pigments

Pigment	Toxic Compound	Weight Percent (%)
Lead chromate	hexavalent chromium	16.1
	lead	64.1
Calcium chromate	hexavalent chromium	33.3
Strontium chromate	hexavalent chromium	25.5
Zinc chromate	hexavalent chromium	28.7
	zinc	36.1
Zinc oxide	zinc	80.3
Lead chromate molybdate *	hexavalent chromium	11.3-14.8
	lead	61.8-64.4

Emissions of solids from automotive surface coating must be estimated in a two-step process. Stack emissions may be estimated by the following equation:

Equation 2: $E_{ss} = V_p \times D \times X_c \times T \times (1\text{-TE}) \times (1\text{-CE}) \times CP$
or $E_{ss} = V_p \times D \times X_c \times T \times (1\text{-FOF}) \times (1\text{-CE}) \times CP$

Where:

E_{ss} = Emissions of solid compound from the stack, lb/yr or lb/hr
V_p = Volume of product used, gal/yr or gal/hr
D = Density of product from MSDS, lb/gal
X_c = Mass fraction of solid compound in product, %/100
T = Mass fraction of toxic constituent in solid compound, %/100
TE = Transfer efficiency, %/100
FOF = Fall out fraction efficiency, %/100
CE = Control efficiency of the spray booth particulate control
CP = Capture efficiency of the spray booth particulate control

Fugitive emissions may be estimated from Equation 3:

Equation 3: $E_{sf} = V_p \times D \times X_c \times T \times (1\text{-FOF}) \times (1\text{-CP})$

Where:

E_{sf} = Emissions of solid compound from fugitive releases, lb/hr or lb/yr
V_p = Volume of product used, gal/yr or gal/hr
D = Density of product from MSDS, lb/gal
X_c = Mass fraction of solid compound in product, %/100
T = Mass fraction of toxic constituent in solid compound, %/100
TE = Transfer efficiency, %/100
CP = Capture efficiency of the spray booth particulate control

Total particulate matter emissions are the sum of the stack and fugitive emissions:

$$E_{stot} = E_{ss} + E_{sf}$$

An example of this calculation would be to determine the particulate emissions of hexavalent chromium from a spray operation using HVLP in an enclosed spray booth (all stack emissions) equipped with standard paper filters. The fallout fraction is 80%. A hypothetical bodyshop survey indicated that 135 gallons of primer containing hexavalent chromium were sprayed. The product had a density of 8.65 lb/gal, and the lead chromate content was 12%. The weight percent of hexavalent chromium in lead chromate is 16.1%. Particulate emissions are:

$$E_{ss} = 135 \text{ gal/yr} \times 8.65 \text{ lb/gal} \times 12/100 \times 16.1/100 \times (1\text{-}80/100) \times (1\text{-}95/100) \times (100/100)$$

$$= 0.23 \text{ lb/yr hexavalent chromium emitted}$$

Emissions for each solid compound of interest can be calculated in a manner similar to that described above. As in the case of volatile organic compounds, this process is simplified using a spreadsheet.

Using equations 1 and 2 above, all of the bodyshop emissions can be estimated using data from the bodyshop survey and the generic formulations, and applying either default or alternate values for fall out fraction, control efficiency, and capture efficiency. In this example, a booth was used and fugitive emissions (Equation 3) were not calculated. Following the procedure outlined here, the toxic emissions inventory for the facility can now be generated.

4.4.8 Transmitting Inventory Data to CARB

The final step in this phase of the process is to transmit the emissions inventory data, either generic or refined, to the CARB for inclusion in the statewide data base. CARB has recommended that the format specified in Appendix H be used to transmit data electronically (on diskette).

5.0 Facility Prioritization

The Air Toxics "Hot Spots" Act requires districts to prioritize facilities for possible adverse health risks and to require high priority facilities to perform health risk assessments. The method used to prioritize facilities is at the discretion of each District. The task force recommends that auto bodyshops included in an industrywide assessment be prioritized in a manner similar to that used by the District for other facilities. Thus, the "scoping" level health risk assessment would be performed only for high priority facilities.

To assist districts in developing prioritization procedures, the CAPCOA Toxics Committee developed the Facility Prioritization Guidelines, July, 1990. One of the procedures described in those guidelines is discussed in this document, but it is acknowledged that other procedures may be equally valid.

Based on the emissions determined from examination of the facility questionnaires and the generic coating profiles, the toxicity of the emitted compounds, and the proximity of the facility to receptors, priority scores can be calculated. Detailed equations for calculation of the priority score are in Appendix I.

The task force recommends that no health risk assessment be performed for facilities that are not designated high priority using this health-protective procedure, since these facilities are unlikely to pose significant risks.

6.0 "Scoping" Health Risk Assessment

For facilities that are prioritized as high priority, a "scoping" or screening health risk assessment is performed to determine if emissions from the facility have the potential to cause a significant health risk. A risk assessment for toxic air pollutants combines results of studies on the potential adverse health effects of various animal and human exposures to the pollutants with results of studies that estimate the level of exposure at different distances from the source of the pollutants. The health risk assessment consists of four steps: hazard identification, dose-response assessment, exposure assessment, and risk characterization.

6.1 Hazard Identification

For air toxics sources, hazard identification involves determining the potential health effects that may be associated with emitted pollutants. The purpose is to identify whether a pollutant is a potential human carcinogen or is associated with other types of adverse health effects. For the auto body industrywide health risk assessment, the pollutants evaluated are a subset of the list of substances for which emissions are to be quantified according to the ARB Emission Inventory Criteria and Guidelines Regulations, January 31, 1994. See Appendix C for the list of compounds addressed in this industrywide assessment. Appendix C also includes toxicity data from the CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines, October 1993 for the compounds addressed.

6.2 Dose-Response Assessment

Dose-response assessment is the process of characterizing the relationship between the exposure to an agent and the incidence of an adverse health effect in the exposed population. In a quantitative carcinogen risk assessment, the dose-response relationship is expressed in terms of a potency slope or inhalation unit risk which is used to calculate the probability or risk of cancer associated with a given exposure level. The Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA) has compiled cancer potency values that were used in this industrywide assessment. The values are from Tables III-5 and III-6 of the CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines, October 1993.

For noncarcinogenic effects, dose-response data developed from animal or human studies are used to develop noncancer reference exposure levels (acute and chronic RELs). These levels are compared to exposures resulting from bodyshop emissions under different release scenarios. The RELs used in this assessment are from Tables III-8 (chronic RELs) and III-10 (acute RELs) of the October 1993 CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines.

Auto bodyshops can emit toxic metals such as lead, hexavalent chromium, cadmium, and nickel which are known to cause cancer in people. Several solvents can be emitted which cause irritation of the respiratory tract and depression of the nervous system. Glycol ethers, lead, and toluene affect developing embryos. In addition to effects by inhalation, some compounds can be absorbed through the skin or ingested from crops grown near the facility. The dose-response data used in this industrywide assessment are listed in Appendix C. The dose-response data will be updated periodically by OEHHA. Industrywide health risk assessments may need to be updated as well based on new data.

6.3 Exposure Assessment

The purpose of the exposure assessment is to estimate the extent of public exposure to each substance for which cancer risk will be quantified or noncancer effects evaluated. This involves emission quantification (discussed above), modeling of environmental transport (discussed below), evaluation of environmental fate, and estimation of short-term and long-term exposure levels. A multipathway exposure model that includes inhalation, ingestion, and dermal routes of exposure was used for this assessment. The noninhalation exposure analysis is included in order to account for exposure to deposited air emissions through pathways such as ingestion of contaminated soils, ingestion of contaminated crops, or dermal absorption. Cadmium, lead, and hexavalent chromium can enter the body through non-inhalation routes. Due to their highly site specific nature, other pathways such as water ingestion and ingestion of local meat and dairy products were not included in this scoping assessment. These pathways may be significant at some locations and may need to be added on a site specific basis.

6.4 Risk Characterization

The final step of risk assessment, risk characterization, is an integration of the health effects and public exposure information developed for emitted pollutants. Maximum individual risks are calculated for receptors at varying distances from the emission source. Risks are calculated for various facility types and product lines. The calculated risk for all pollutants emitted from a single facility are combined and compared to acceptable criteria.

For this type of assessment, either the HRA or the ACE2588 Risk Assessment Model are typically used. These models use emissions estimates and air dispersion modeling results to calculate multipathway exposures and risks as described in the CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines, October 1993.

6.5 "Scoping" Level Release Scenarios and Dispersion Modeling

Most automotive surface coating occurs in spray booths. The spray booths are typically equipped with exhaust fans and stacks. Spray booths are modeled as point sources. Typical release parameters for this study were based on District staff field observations of a number of facilities. The height of the stacks vary, but the releases are generally between 25 and 30 feet above ground level. Stack diameters generally range from 1.5 to 3 feet. Spray booth exhaust fans are typically rated at 7,500 - 15,000 cfm. Exhaust is near ambient temperature.

Downwash may occur due to the presence of buildings. Based on field observations, four "generic" sets of building dimensions were developed. These generic building dimensions are believed to describe the majority of buildings where automotive surface coating occurs. Four building sizes were assessed. All building configurations were estimated at 20 feet tall, with varying sizes of 20 by 20 feet, 20 by 75 feet, 75 by 100 feet, and 100 by 150 feet. (It was later noted through the modeling analysis that the calculated concentrations did not differ for each of these building sizes; therefore, a single set of modeling results are discussed below).

In some cases, spray booth stacks end in a horizontal direction rather than vertical. Other stacks are equipped with a rain cap or other device which obstructs the vertical flow of the exhausted emissions. For these situations, a stack velocity of zero was used, to simulate that no vertical dispersion occurs due to stack gas momentum.

Some coating operations may be performed in an open area, without a spray booth. This type of operation was modeled as a volume source. The dimensions of the volume source were assumed to be 5 ft x 10 ft x 5 ft high, corresponding to the approximate area occupied by a car being painted.

Based on the above, and preliminary modeling results, seven release scenarios were modeled. Six of these were stack-type releases, four with vertical velocity and two with obstructions to vertical flow. The seventh scenario was an unconfined, outdoor release simulated as a volume source. The scenarios are described in Table 4.

Concentrations of air toxics emitted from auto bodyshops at receptors were predicted using air quality dispersion models. Air quality modeling uses computer based algorithms to estimate how a pollutant emitted from a source will affect the surrounding air quality. The computer programs, called air quality dispersion models, simulate the movement and dispersion of pollutants after they are released into the air. The results of the model depend on very specific inputs such as meteorological conditions (e.g., temperature and wind speed), the physical characteristics of the pollution source (e.g., height of a stack), and the surrounding topography or terrain. The model predicts the concentration of a pollutant at any given distance from the original sources.

Several air dispersion models have been developed and approved by the USEPA. Two of these were used in this analysis: ISCST2 and SCREEN2. Later versions of each of these models (ISCST3 and SCREEN3) have since been approved for use by the U.S. Environmental Protection Agency and should be used in any future analyses. However, it is not expected that the use of these later models would significantly impact the results of these analyses. Both ISCST2 and SCREEN2 are Gaussian dispersion models suitable for use in screening-level applications. For the scoping assessment, each of the models was used in a flat-terrain mode.

Each of the generic release scenarios was modeled using both SCREEN2 and ISCST2. SCREEN2 used default meteorological data to calculate maximum hourly concentrations. It is suitable for use in any locale (although as stated, in this assessment, it was run in the flat terrain mode) and designed not to underpredict air quality impacts. In order to estimate concentrations for averaging times longer than one hour, averaging time adjustment factors are often employed. Following guidance of U.S. Environmental Protection Agency and California Air Resources Board (Ranzieri, 1994), an exposure adjustment factor of 0.08 was employed to predicted annual average concentrations from the one-hour maxima. Monthly estimates are also valuable for comparison to monthly air quality standards for lead. An exposure adjustment factor of 0.3 was used to estimate monthly concentrations (Ranzieri, 1994).

Table 4. Description of Generic Modeling Source Categories

Source Description	Stack Height (feet)	Stack Height (meters)	Exit Velocity (fps)	Exit Velocity (mps)	Exit Diameter (feet)	Exit Diameter (meters)	Exit Temperature F	Exit Temperature K
25-ft stack, 30 fps velocity	25	7.6	30	9.1	2.5	0.76	70	294
30-ft stack, 30 fps velocity	30	9.1	30	9.1	2.5	0.76	70	294
25-ft stack, 75 fps velocity	25	7.6	75	22.9	2.0	0.61	70	294
30-ft stack, 75 fps velocity	30	9.1	75	22.9	2.0	0.61	70	294
25-ft stack with obstruction to vertical flow	25	7.6	0 (Downward)	0 (Downward)	2.0	0.6	70	294
30-ft stack with obstruction to vertical flow	30	9.1	0 (Downward)	0 (Downward)	2.0	0.6	70	294
Source Description	**Volume Height (feet)**	**Volume Height (meters)**	**Initial Sigma Y (feet)**	**Initial Sigma Y (meters)**	**Initial Sigma Z (feet)**	**Initial Sigma Z (meters)**	**Exit Temperature F**	**Exit Temperature K**
Fugitive release outside of a building	2.5	0.76	4.7	1.4	2.3	0.71	NA	NA

Sigma Y is the initial horizontal dimension.
Sigma Z is the initial vertical dimension.

The ISCST2 model differs from SCREEN2 in that it is more data intensive and is designed to treat more complex release situations. ISCST2 requires site-specific hourly meteorological data and can calculate concentrations for multiple averaging times, including maximum one hour, monthly, and annual average values. Given the use of site-specific meteorology and more detailed dispersion algorithms, simulations using ISCST2 are more refined than those of SCREEN2, and should provide a better site-specific estimate of ground-level concentrations. (Estimates using ISCST2 are typically less conservative, i.e., lower than those of SCREEN2.)

This dispersion modeling assessment was limited in scope. Both the SCREEN2 and ISCST2 models contain a number of model options. In addition, as discussed above, the ISCST2 model requires site-specific meteorological data. For this assessment, the effort was limited in scope to two actual meteorological sites in San Diego County, an inland and coastal site. The ISCST2 model was run in the "rural" mode, which affects the results of the dispersion algorithms and often predicts slightly greater ground-level concentration estimates. SCREEN2 analyses were run in both "rural" and "urban" modes. The models used regulatory agency-recommended model default options and switches.

Results were calculated for various distances extending from 10 meters to 1000 meters from the source. Near to the source, receptor points were arranged at 25 meter radial distances from the source to a distance of 200 meters. Receptor grid spacing of 50 meters was used to a distance of 500 meters, and finally receptor radials were placed at 600, 750 and 1000 meters. The stack releases were modeled in such a way as to include the assessment of building downwash which tends to increase ground-level concentrations near to the stack. As discussed above, four building configurations were evaluated; however, predicted concentrations did not differ among the four building configurations. Therefore, a single set of modeling results are discussed below.

Each of these models was run with a unit emission rate of one gram per second (g/s) to calculate a relative concentration (often referred to as X/Q, or relative dispersion factor). X/Q values in $\mu g/m^3$ per g/s have also been converted to units of $\mu g/m^3$ per lb/hr and $\mu g/m^3$ per lb/yr. These X/Q values can then be multiplied by a calculated emission rate of a particular toxic constituent, in corresponding units to estimate the ambient concentration of that toxicant. A comparison of the X/Q values can also be used to provide a comparative estimate of the dispersive potential of each release scenario, i.e., a comparison of the effectiveness of each source type in dispersing air pollutants. Similarly, because risk is directly proportional to X/Q, a comparison of X/Q values from each release type provides an indicator of the relative risk related to each release scenario.

6.5.1 Dispersion Modeling Results

The results of the dispersion modeling analyses are summarized herein with detailed results provided in Appendix J.

Table 5 provides the maximum calculated X/Q for each evaluated release scenario, meteorological regime and averaging period. X/Q values are provided in units of $\mu g/m^3$ per g/s, per lb/hr, and per lb/yr. Lower X/Q values relate to better dispersion and, correspondingly, lower toxicant concentrations and reduced risk. In all cases, stack releases with no obstruction to vertical flow result in lowest X/Q values, and therefore, greatest dispersive potential. The best performing scenario to the worst performing scenario can be ranked as follows:

1. Taller Stack (30 feet), Highest Exit Velocity (75 feet per second)
2. Lower Stack (25 feet), Highest Exit Velocity (75 feet per second)
3. Taller Stack (30 feet), Lower Exit Velocity (30 feet per second)
4. Lower Stack (25 feet), Lower Exit Velocity (30 feet per second)
5. Taller Stack (30 feet), No Vertical Flow
6. Lower Stack (25 feet), No Vertical Flow
7. Fugitive Source

Model input files for the scenarios included in this guideline are available on diskette from local districts. These input files can be run with local meteorological data as a refinement to the screening risk assessment.

Dispersion factors calculated for point sources with no vertical flow are about an order of magnitude higher than those without obstruction, and fugitive releases are several orders of magnitude higher.

Maximum hourly X/Q values vary significantly among the release scenarios; however, they do not differ significantly between meteorological data. For point sources, values range from about 150 for the taller stack and higher flow rate to almost 1000 for the lower stack and lesser flow rate. Without vertical flow, the hourly X/Q values ($\mu g/m^3/g/s$) range from 5,000 to 12,000 for the 25 and 30 foot stacks, respectively, up to 158,000 for the fugitive release. Additional variation in X/Q with meteorological data is seen with increasing averaging time. For the annual assessment, the generic meteorology can result in two to three times the X/Q values derived from real meteorology. The X/Q value range is 8 to approximately 80 for point sources with vertical flow, 100 to 1000 for stacks with vertical flow obstruction, and up to 13,000 for fugitive sources.

Table 5. Maximum Calculated Dispersion Factors for Various Source Types and Meteorological Data

Source Description	Max Annual X/Q - ug/m3 per g/s				Max Hourly X/Q - ug/m3 per g/s				Max Monthly X/Q - ug/m3 per g/s			
	San Diego		SCREEN2		San Diego		SCREEN2		San Diego		SCREEN2	
	Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban
25-ft stack, 30 fps velocity	51	36	69	77	758	797	868	964	88	59	260	289
30-ft stack, 30 fps velocity	28	26	26	55	414	312	326	682	47	43	98	205
25-ft stack, 75 fps velocity	15	11	22	36	278	279	274	456	24	18	82	137
30-ft stack, 75 fps velocity	11	8	12	26	148	151	153	328	18	14	46	99
25-ft stack with obstruction to vertical flow	235	455	1015	423	11635	12552	12690	5283	364	1014	3807	1585
30-ft stack with obstruction to vertical flow	96	104	450	205	4659	5065	5627	2562	149	395	1688	769
Fugitive release outside of a building	7667	13101	12616	9264	134352	134977	157700	115800	11614	27658	47310	34740

Source Description	Max Annual X/Q - ug/m3 per lb/yr				Max Hourly X/Q - ug/m3 per lb/hr				Max Monthly X/Q - ug/m3 per lb/mo			
	San Diego		SCREEN2		San Diego		SCREEN2		San Diego		SCREEN2	
	Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban
25-ft stack, 30 fps velocity	7.4E-04	5.2E-04	1.0E-03	1.1E-03	96	101	110	122	0.015	0.010	0.046	0.051
30-ft stack, 30 fps velocity	4.0E-04	3.8E-04	3.8E-04	7.8E-04	52	39	41	86	0.008	0.008	0.017	0.036
25-ft stack, 75 fps velocity	2.1E-04	1.5E-04	3.2E-04	5.2E-04	35	35	35	58	0.004	0.003	0.014	0.024
30-ft stack, 75 fps velocity	1.6E-04	1.2E-04	1.8E-04	3.8E-04	19	19	19	41	0.003	0.002	0.008	0.017
25-ft stack with obstruction to vertical flow	3.4E-03	6.5E-03	1.5E-02	6.1E-03	1470	1585	1603	667	0.064	0.178	0.667	0.278
30-ft stack with obstruction to vertical flow	1.4E-03	1.5E-03	6.5E-03	2.9E-03	588	640	711	324	0.026	0.069	0.296	0.135
Fugitive release outside of a building	1.1E-01	1.9E-01	1.8E-01	1.3E-01	16969	17048	19918	14626	2.034	4.844	8.287	6.085

Note: Values of 0.08 and 0.3 were used to extrapolate the SCREEN2 maximum hourly value to an annual and monthly value, respectively.

Dispersion factors also vary significantly with distance from the source. Maxima occur within 75 meters for the stacks without vertical flow, and within 10 meters for fugitive sources. For those sources with exit velocities of 30 feet per second, maxima occur generally within 125 meters, but may occur as far as 250 meters from the source. For those with higher exit velocities (75 feet per second as opposed to 30 feet per second), maxima occurring generally 50 meters further from the source.

The SCREEN2 model generally gave representative results in comparison to ISCST2 with site-specific meteorological data, and based on this limited assessment, SCREEN2 looks like it will serve as an adequate screening tool for most applications. SCREEN2 was slightly more conservative (which would result in the calculation of higher risk values) for all but a few cases related to hourly dispersion, and in those cases where the ISCST2-calculated values exceeded those of SCREEN2, the difference was minor.

The difference between ISCST2 results and those of SCREEN2 when extrapolated from hourly to annual estimates was most notable with the fugitive emissions scenario. Here, the estimates varied by a factor of three. Otherwise, annual projections for SCREEN2 results were within 20 percent of the ISCST2 calculations.

6.5.2 Comparative Dispersion Modeling and Implications for Risk Reduction

Reduction of emissions of toxic compounds is the preferred method for reducing risks. Coating distributors can be contacted regarding the existence and suitability of products that have less or none of the toxic compound(s) of concern. In addition to emission reduction, risks can be reduced by changing dispersion characteristics.

Comparative dispersion modeling results provide a basis for risk management decisions related to source dispersion characteristics and siting. Methods of managing risks which were evaluated include:

- enclosing fugitive emissions
- increasing the distance from the stack to the fenceline,
- removing obstruction to vertical flow (raincap),
- increasing the stack height,
- increasing stack exit velocity,

Summary findings are discussed below.

<u>Decreasing risk by enclosing fugitive emissions</u>
Facilities that perform painting outside a paint spray booth were found to have the greatest overall impact. Use of a spray booth equipped with filters or other particulate controls significantly reduces particulate emissions. Additionally, emissions from a

stack are dispersed more efficiently than ground level fugitive emissions. To reduce toxic impacts, spray operations should be conducted within an enclosed spray booth.

Decreasing risk from fugitive emissions by increasing distance to the fenceline

Some larger facilities can consider relocating sources away from fenceline locations and nearby receptors, and thereby reducing the risk to offsite receptors. Increasing the distance to the fenceline or the nearest receptor by a factor of five (for example from 10 meters to 50 meters) resulted in a risk decrease of a factor of 3 to 9 for the ISCST2 run using coastal meteorology, 3 to 6 for the ISCST2 run using inland meteorology, and 3 to 7 using SCREEN2, for rural and urban areas, respectively.

Decreasing risk by removing obstruction to vertical flow

Emissions directed upward instead of downward produces the largest risk reduction in this study. On an hourly basis, risk reduction of at least a factor of 12 can be achieved in rural settings and 5 in urban settings, by directing flow upward with even the minimum velocity (30 feet per second). Similarly, an annual decrease of a factor of 4 can be achieved.

Decreasing risk by increasing stack height

A 20 percent increase in stack height (e.g., increasing release height from 25 to 30 feet) can reduce risk by a factor of one and one-third to three. Local codes should be consulted before recommending an increase in stack height. Additionally, stack heights should not exceed EPA's GEP (Good Engineering Practice) heights. For auto bodyshops, this generally is 2.5 times the building height.

Decreasing risk by increasing stack exit velocity

Increasing stack exit velocity by a factor of 2.5 (e.g., increasing velocity from 30 to 75 feet per second) produced proportional risk decreases, lower by a factor of two to three. Note that an exit velocity of at least 50 feet per second is often recommended to avoid stack tip downwash. However, stack velocity should not be recommended for change without first consulting a HVAC professional or the spray booth manufacturer for approval of the increase in stack exit velocity.

Summary results

The greatest potential for reducing risk by enhancing dispersion lies in ensuring that emissions are directed in a vertical direction with some upward momentum. Impact reductions of factors 12 to 15 were found. All other techniques, including fenceline distance increases, stack height increases, and exit velocity increases provided risk reductions of between factors of two to three.

In addition to the above, the CARB has developed risk reduction guidelines for auto bodyshops under SB 1731. These guidelines should be consulted for more information on reducing emissions and risk from auto bodyshops. A copy of the risk reduction guidelines can be obtained from the California Air Resources Board, Stationary Source Division, Emission Assessment Branch (916/323-4327).

6.6 "Scoping" Level Risk Assessment Methodology

For scoping level risk assessments, it is appropriate to use the SCREEN2 model to estimate concentrations of toxic compounds at off-site receptors. The model was run using the emission scenarios described above, and an emission rate of 1 lb/yr. The SCREEN2 model provides concentrations at each receptor distance that is included in the modeling run. In addition, the location with the highest impact (X/Q) will be found by the SCREEN2 model. X/Q values at various distances for the seven emission scenarios examined are included in Appendix J.

Some toxic compounds emitted from auto bodyshops; specifically cadmium, hexavalent chromium, and lead; can enter the body through routes other than inhalation (i.e., absorbed through the skin, ingested, etc.). These compounds are known as multipathway pollutants. Risk assessments generally include a multipathway analysis to account for these other routes of exposure.

Multipathway values in Appendix C may be used for scoping assessments unless otherwise directed by the District. The cancer factors were developed by comparing multipathway risk results to the results of risks due only to inhalation. The cancer multipathway factor is the ratio of the multipathway risk to the inhalation risk. These factors differ due to choices in assumptions, such as fraction of home grown produce and pollutant deposition rate. For cancer risk screening, the factors should be applied to each multipathway pollutant emitted from the auto bodyshop being modeled.

6.6.1 Cancer Risk Calculation

The equation for calculating the maximum cancer risk is:

Equation 4: $R_i = X/Q \times Q_i \times MPA \times UR_i$

where,

R_i = Risk from each compound (per million)
X/Q = Peak concentration from SCREEN2 modeling based on 1 lb/yr emission rate $(\mu g/m^3)/(lb/yr)$
Q_i = Actual emission rate of each compound (lb/yr)
MPA = Multipathway adjustment factor (if applicable)
UR_i = Unit risk factor for each pollutant $(\mu g/m^3)^{-1}$

R_i is summed for each pollutant to determine the total cancer risk.

6.6.2 Chronic Noncancer Risk Calculation

Screening-level chronic and acute hazard indices should also be calculated. Multipathway factors have also been developed by SCAQMD and SDCAPCD for chronic noncancer health effects. These factors are the ratio of the exposure from ingestion to the exposure through inhalation. The chronic hazard index can be calculated using the peak annual X/Q , the chronic adjustment factor and the chronic noncancer Reference Exposure Levels (REL). For the chronic hazard index calculation, the adjustment factors should be applied to all appropriate compounds.

The equation for calculating the screening chronic hazard index is:

Equation 5: $HI_{ci} = (X/Q \times Q_i \times CF)/(REL_i)$

where,

HI_{ci} = Individual chronic hazard index for each compound
X/Q = Peak concentration from SCREEN2 modeling based on 1 lb/yr emission rate ($\mu g/m^3$)/(lb/yr)
Q_i = Actual emission rate of each compound (lb/yr)
CF = Chronic noncancer multipathway adjustment factor (if applicable)
REL_i = Chronic Reference Exposure Levels for each pollutant ($\mu g/m^3$)

Note that a multipathway factor of 1.00 should be used for all compounds when calculating the noncancer chronic hazard index for the respiratory endpoint.

The individual chronic hazard indices should be found for the appropriate toxicological endpoint to determine the total chronic hazard index. The individual hazard indices are summed for each endpoint to determine the maximum total chronic noncancer risk. However, as a first cut, if the sum of all HI's does not exceed 1, no further evaluation is necessary.

6.6.3 Acute Noncancer Risk Calculation

The total acute hazard index is calculated much the same as was the chronic. The total acute hazard index, however, is based on peak hourly emissions (lb/hr). As for the total chronic hazard index, the individual hazard index for each substance affecting the same toxicological endpoint is summed to determine the maximum total acute noncancer risk.

The equation for calculating the total acute hazard index is:

Equation 6: $HI_{ai} = (X/Q * Q_i)/(REL_i)$

where,

HI_{ci} = Individual chronic hazard index for each compound
X/Q = Peak hourly concentration from SCREEN2 modeling based on 1 lb/hr emission rate ($\mu g/m^3$)/(lb/hr)
Q_i = Peak hourly emission rate of each compound (lb/hr)
REL_i = Acute Reference Exposure Levels for each pollutant ($\mu g/m^3$)

Lead should be evaluated as a subchronic 30-day exposure. Districts may contact OEHHA for further information.

Calculations may be facilitated by use of tables, either hardcopy or in a spreadsheet, similar to Tables 6 through 8. An example of use of this type of table is included in Appendix L, Tables L-6 through L-8.

Within many districts, facilities with a total cancer risk of 10^{-5} or greater, or an acute or chronic hazard index (HI) greater than 1.0 at a residential (MEIR) or worker (MEIW) receptor are considered to pose a significant risk to those exposed. If the results of the scoping risk assessment yield a total cancer risk of 10^{-5} or greater or an acute or chronic hazard index (HI) greater than 1.0 at a residential (MEIR) or worker (MEIW) receptor values (or other significant levels as identified by the District), then a refined risk assessment should to be conducted for the facility under consideration. Since it was envisioned that districts would perform industrywide risk assessments, districts may need to conduct refined risk assessments for high risk facilities.

6.7 Sample Applications

An example screening risk assessment has been prepared using the results from the dispersion modeling described above and preliminary estimates of toxic emission rates as surveyed for 39 auto bodyshops in an ABTF member District. This screening health risk assessment uses a generic approach. It combines the maximum dispersion factors as calculated with SCREEN2 using the "rural" mode for three release scenarios:

1. The stack release scenario for the 25-foot stack and the 30 foot per second exit velocity. This resulted in the greatest impact (i.e., least dispersion) for the stack cases without obstruction to vertical flow.

2. The stack release scenario for the 25-foot stack designed with a raincap. This resulted in the greatest impact for the stack cases with obstruction to vertical flow.

Table 6. Carcinogenic Risk Worksheet

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: RURAL or URBAN
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/yr	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban
1	25	30	1.0E-03	1.1E-03
2	30	30	3.8E-04	7.9E-04
3	25	75	3.2E-04	5.2E-04
4	30	75	1.8E-04	3.8E-04
5	25	Raincap	1.5E-02	6.1E-03
6	30	Raincap	6.5E-03	3.0E-03
7	Fugitive	Fugitive	1.8E-01	1.3E-01

4. Transfer appropriate X/Q values and emission rates into table below.
5. Identify source as controlled or uncontrolled: CONTROLLED or UNCONTROLLED
6. Multiply emission rate, X/Q, unit risk factor and multipathway factor (either controlled or uncontrolled) for each toxicant. List product as Individual Excess Cancer Risk.
7. Sum Individual Excess Cancer Risk for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If this is exceeded, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/yr)	X/Q (ug/m3 per lb/yr)	TOXICITY DATA FOR CANCER EVALUATIONS: UNIT RISK FACTOR (m^3/ug)	PRELIM. POTENCY VALUE (1) (m^3/ug)	MULTIPATHWAY FACTOR (2) CONTR	MULTIPATHWAY FACTOR (2) UNCONTR	INDIV EXCESS CANCER RISK
CADMIUM AND COMPOUNDS	7440-43-9			4.2E-03	NA	1.00	1.00	
CHROMIUM (HEXAVALENT)	18540-29-9			1.4E-01	NA	1.01	1.03	
LEAD AND COMPOUNDS	7439-92-1			1.2E-05	NA	1.00	1.00	
METHYLENE CHLORIDE	75-09-2			1.0E-06	NA	1.00	1.00	
NICKEL AND NICKEL COMPOUNDS	7440-02-0			2.6E-04	NA	1.00	1.00	
				SUMMATION FOR ALL TOXICANTS				

NOTES:

1. Preliminary potency values should be used at the discretion of the District.
2. Multipathway factors are the ratio of the total risk to inhalation risk. These have been developed using HRA92, version 1.1, a multipathway exposure model developed jointly by the California Air Resources Board and the Office of Environmental Health Hazard Assessment. Assumptions and parameters used to develop the the multipathway factors include:
   - Emission rate = 1 g/s
   - X/Q = 1
   - Deposition velocity = 0.02 m/s for controlled sources and 0.05 m/s for uncontrolled sources
   - 70-year exposure
   - Fraction of homegrown fruits and vegetables consumed = 10%
   - Pathways/sources include inhalation, ingestion of soil (pica), homegrown vegetables, mother's milk (for one year) and skin contact.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

Table 7. Non-Cancer Chronic Health Hazard Index Worksheet

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: RURAL or URBAN
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/yr	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban
1	25	30	1.0E-03	1.1E-03
2	30	30	3.8E-04	7.9E-04
3	25	75	3.2E-04	5.2E-04
4	30	75	1.8E-04	3.8E-04
5	25	Raincap	1.5E-02	6.1E-03
6	30	Raincap	6.5E-03	3.0E-03
7	Fugitive	Fugitive	1.8E-01	1.3E-01

4. Transfer appropriate X/Q values and emission rates into table below.
5. Identify source as controlled or uncontrolled: CONTROLLED or UNCONTROLLED
6. For each toxicant, multiply emission rate, X/Q, and multipathway factor (either controlled or uncontrolled). Divide that product by the REL for each toxicant. List product as Chronic Health Hazard Index.
7. Sum Hazard Index for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If summation exceeds 1, sum individually for each toxic endpoint and record maximum endpoint and endpoint-specific HHI. If value exceeds 1, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/yr)	X/Q (ug/m3 per lb/yr)	TOXICITY DATA FOR NON-CANCER CHRONIC EVALUATIONS: REL (ug/m^3)	MULTIPATHWAY FACTOR (1): CONTR	MULTIPATHWAY FACTOR (1): UNCONTR	SYSTEM OR ORGAN EFFECTED: CV/BL	CNS/PNS	IMMU	KIDN	GI/LV	REPR	RESP	CHRONIC HEALTH HAZARD INDEX
CADMIUM AND COMPOUNDS	7440-43-9			3.5E+00	16.86	38.93				X			X (2)	
CHROMIUM (HEXAVALENT)	18540-29-9			2.0E-03	1.00	1.00				X	X		X	
COPPER AND COMPOUNDS	7440-50-8			2.4E+00	1.00	1.00							X	
ETHYLENE GLYCOL (MONO)-BUTYL ETHER	111-76-2			2.0E+01	1.00	1.00						X	X	
ETHYL BENZENE	100-41-4			1.0E+03	1.00	1.00						X		
LEAD AND COMPOUNDS	7439-92-1			1.5E+00	1.00	1.00	X	X	X	X		X		
METHYL ETHYL KETONE	78-93-3			1.0E+03	1.00	1.00						X		
METHANOL	67-56-1			6.2E+02	1.00	1.00		X						
METHYLENE CHLORIDE	75-09-2			3.0E+03	1.00	1.00		X			X			
NICKEL AND NICKEL COMPOUNDS	7440-02-0			2.4E-01	1.00	1.00			X	X			X	
PROPYLENE GLYCOL (MONO) METHYL ETHER	107-98-2			2.0E+03	1.00	1.00		X						
STYRENE	100-42-5			7.0E+02	1.00	1.00					X			
TOLUENE	108-88-3			2.0E+02	1.00	1.00		X				X		
XYLENES (M,O,P ISOMERS)	1210			3.0E+02	1.00	1.00						X	X	
ZINC AND COMPOUNDS	7440-66-6			3.5E+01	1.00	1.00	X						X	
								SUMMATION FOR ALL TOXICANTS						
								PRIMARY TOXIC ENDPOINT						

NOTES:

1. Multipathway factors are the ratio of the total risk to inhalation risk. These have been developed using HRA92, version 1.1, a multipathway exposure model developed jointly by the California Air Resources Board and the Office of Environmental Health Hazard Assessment. Assumptions and parameters used to develop the the multipathway factors include:
   - Emission rate = 1 g/s
   - X/Q = 1
   - Deposition velocity = 0.02 m/s for controlled sources and 0.05 m/s for uncontrolled sources
   - 70-year exposure
   - Fraction of homegrown fruits and vegetables consumed = 10%
   - Pathways/sources include inhalation, ingestion of soil (pica), homegrown vegetables, mother's milk (for one year) and skin contact.
2. A multipathway factor of 1.00 should be used to calculate the non-cancer chronic hazard index for the respiratory endpoint.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

Table 8. Non-Cancer Acute Health Hazard Index Worksheet

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: RURAL or URBAN
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/hr		Max X/Q in lb/mo	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban	Rural	Urban
1	25	30	110	122	0.046	0.051
2	30	30	41	86	0.017	0.036
3	25	75	35	58	0.014	0.024
4	30	75	19	41	0.008	0.017
5	25	Raincap	1603	667	0.667	0.278
6	30	Raincap	711	324	0.296	0.135
7	Fugitive	Fugitive	19918	14626	8.287	6.085

4. Transfer appropriate X/Q values and emission rates into table below. Use the monthly X/Q value and maximum monthly emission rate (lb/mo) for lead only.
5. Identify source as controlled or uncontrolled: CONTROLLED or UNCONTROLLED
6. For each toxicant, multiply emission rate, and X/Q. Divide that product by the REL for each toxicant. List product as Acute Health Hazard Index.
7. Sum Hazard Index for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If summation exceeds 1, sum individually for each toxic endpoint and record maximum endpoint and endpoint-specific HHI. If value exceeds 1, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/hr) (lb/mo for lead)	X/Q (ug/m3 per lb/hr)	TOXICITY DATA FOR ACUTE EVALUATIONS						ACUTE HEALTH HAZARD INDEX
				ACUTE REL (ug/m^3)	TOXIC ENDPOINT OR TARGET ORGAN: CNS/ PNS	IMMUN	REPRO/ DEV'L	RESP	EYE	
COPPER AND COMPOUNDS	7440-50-8			1.0E+01 [1.0E+2]				X		
ETHYLENE GLYCOL (MONO)BUTYL ETHER (BUTYL CELLOSOLVE, 2-BUTOXYETHANOL)	111-76-2			1.5E+03 [5.5E+3]			X	X		
ISOPROPANOL	67-63-0			[4.9E+4]				X	X	
LEAD AND COMPOUNDS	7439-92-1			1.5 (2)	X					
METHANOL	67-56-1			[2.8E+4]	X					
METHYLENE CHLORIDE	75-09-2			3.5E+03 [8.3E+4]	X					
METHYL ETHYL KETONE	78-93-3			[1.2E+4]				X		
NICKEL AND NICKEL COMPOUNDS	7440-02-0			1.0E+00 [3.3E+0]		X				
STYRENE	100-42-5			[2.2E+4]				X	X	
TOLUENE	108-88-3			[3.7E+4]				X		
XYLENES (M,O,P ISOMERS)	1210			4.4E+03 [2.2E+3]				X		
				SUMMATION FOR ALL TOXICANTS						
				PRIMARY TOXIC ENDPOINT						

NOTES:

1. Values in brackets [ ] are proposed and are for informational purposes. Several of the revised acute RELs are higher than the previous values meaning that the acute HHI for the chemical will decrease. The numbers are not official until after Scientific Review Panel review and adoption by OEHHA.
2. Lead should be evaluated as a sub-chronic or 30-day exposure.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

3. The fugitive release scenario.

Not all toxicants expected to be emitted from auto bodyshop operations (Appendix C) were reported as emittants from these facilities. The annual average emission rate for each toxicant was estimated as the average of all facilities reporting emissions of that toxicant. The maximum hourly emission rate has been estimated as 10 times the annual average emission rate. Because of the rural nature of the locale, these facilities may be considered small auto bodyshops. There may be significantly greater emission rates in larger shops.

Health risk estimates for the maximum exposed individual (MEI) for this screening example are summarized in Table 9. A more detailed table is provided in Appendix K. Hexavalent chromium was responsible for almost the entire cancer risk (99.5 percent) and chronic health hazard index (96 percent). Xylenes were responsible for 88 percent of the acute health hazard index.

Table 9
Summary of Maximum Results of Generic Risk Assessment for a Generic Auto Bodyshop (Rural Basis)

	Exit Scenario		
	Stack	Stack with Raincap	No Booth
Individual Excess Cancer Risk per million	**18**	**270**	**3400**
Chronic Health Hazard Index	0.07	**1.0**	**12**
Acute Health Hazard Index	0.01	0.01	**2.0**

A step-by-step, or "cookbook" approach for completion of a similar risk assessment is provided in Appendix L.

These values can be compared to significance levels of each air district. Values which have been highlighted **(bold)** may be significant.

6.8 Refined Health Risk Assessment and Special Applications

The assumptions used in this industrywide assessment may not be appropriate for facilities other than typical automotive recoating facilities. This might include facilities that coat vehicles other than cars and light trucks, such as construction equipment or buses. Specifically, the types of coatings used may differ significantly from the formulations assumed for the industrywide assessment. Also, due to the larger size of the equipment coated, the release characteristics may be different. For these types of facilities, source specific data should be used.

The dispersion modeling addressed only simple terrain and ground level receptors. Additional site specific evaluation may be needed if there is complex terrain or elevated (flagpole) receptors near a facility.

Additionally, if the scoping level health risk assessment indicates that emissions from the facility may result in a significant health risk (cancer risk of 10^{-5} or greater or a chronic or acute HI of 1 or greater), the task force recommends that the health risk assessment be refined before the public is formally notified of the risk assessment results or before risk reduction measures are contemplated. Refinements could include using facility specific emissions data instead of the generic profiles, determining actual release parameters and receptor data, use of site specific pathway data, use of actual local meteorological data, and possibly an alternative air dispersion model.

For details on performing a refined health risk assessment, consult the CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines, October 1993.

If a specific facility under review is sited in an area where nearby terrain features exceed the height of the stack, the models used in this study may not be applicable. A newly released model, ISCST3, designed for both flat and complex terrain applications may be more suitable. The SCREEN2 model may also be used with terrain adjustments. In either case site-specific terrain elevations must be input for use of the model in this mode.

7.0 References

California Air Pollution Control Officers Association (CAPCOA), Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993.

California Air Pollution Control Officers Association (CAPCOA), Facility Prioritization Guidelines, July 1990.

Ranzieri, A., Modeling Support Section, Technical Support Division, California Air Resources Board, Memorandum to J. Brooks, April 11, 1994.

Appendices

Appendix A - Glossary and Acronyms

AB 2588 - The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (California Health and Safety Code Section 44300 et. seq.)

ACE 2588 - Computer model used for AB 2588 Health Risk Assessments developed by the Santa Barbara Air Pollution Control District. It is a public-domain, multi-source, multi-pollutant, multi-pathway risk assessment model. It is consistent with the CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines.

Air Pollution Control Device - A device designed or used as a means of collecting, destroying, or collecting and removing airborne emissions from an emission source for subsequent release or treatment at another location.

Antiglare/Safety Coating - A coating formulated to eliminate glare for safety purposes on interior surfaces of a vehicle and which shows a reflectance of 25 or less on a 60^0 gloss meter.

Building Downwash - Aerodynamic turbulence induced by a nearby building that causes a pollutant emitted from an elevated source to be mixed rapidly toward the ground, resulting in higher ground level concentration immediately to the lee of the building than would otherwise occur.

CAPCOA - California Air Pollution Control Officers Association

CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines - The most recent version of the guidelines for preparation of health risk assessments pursuant to California Health and Safety Code Section 44360(b)(1) that has been approved by CAPCOA.

Capture Efficiency - The percentage, by weight, of the airborne emissions from an emission source or sources that is collected, contained, and conveyed to another location without loss of the airborne emissions.

Control Efficiency - The percentage, by weight, of a toxic air contaminant entering a control device that is not emitted to the atmosphere.

Controlled Coatings - Coatings formulated to comply with volatile organic compound requirements in district rules that are effective after January 1, 1995.

Conventional (Air Atomized) Spray Application - Use of compressed air to atomize the coating into tiny droplets and to spray the coating onto the surface of the article to be coated.

Default Meteorology - The same as screening meteorology.

Dispersion Model - A computer model using mathematical equations that represent the processes that occur when a facility releases a pollutant and also the movement of pollutants through the air. Factors such as distance from the source to exposed persons, wind speed and direction, and smokestack height affect these estimates.

Dispersive Potential - The expected ability of a source, based on its unique exit characteristics, to disperse pollutants.

Filters - Devices for collecting particulate matter exhausted from paint spray booths or prep stations before it is emitted to the ambient air. Dry filters can be divided into two types: pad type and baffle type. Baffle filters use baffle plates to force the air to change direction and to provide a surface for the particulate to adhere to. Pad type filters are usually a woven mesh through which air flow passes. The particulate is trapped on the filters.

Fugitive - A release that cannot be characterized as from a stack (see definition of stack).

Hand Application Methods - The application of coatings by nonmechanical hand-held equipment including but not limited to paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags, and sponges.

Hazard Index - The hazard index is an expression of the potential noncancer adverse health effects from emissions from a facility. It is calculated by dividing the estimated exposure level of a toxic air contaminant by the Reference Exposure Level. The individual hazard indices for each substance affecting the same target organ are summed to determine the total hazard index for each target organ.

Health Risk Assessment - Health Risk Assessment is a tool used in risk management. It is the process that scientists and government officials use to estimate the potential increased risk of health problems in people who are exposed to different amounts of toxic substances. A risk assessment for a toxic air pollutant combines results of studies on the health effects of various animal and human exposures to the pollutant with results of studies that estimate the level of people's exposures at different distances from the source of the pollutant.

High-Volume, Low-Pressure Application (HVLP) - Spray equipment which uses a high volume of air delivered at pressures between 0.1 and 10 psig and which operates at a maximum fluid delivery pressure of 50 psig.

ISCST2 - Industrial Source Complex - Short Term dispersion model. A USEPA computer model for estimating ambient air concentrations assuming Gaussian diffusion.

Lacquer - Coating composition which is based on synthetic film-forming material dissolved in organic solvent and which dries primarily by solvent evaporation. Typical lacquers include those based on nitrocellulose derivatives, vinyl resins, acrylic resins, etc.

Latexes - Paint containing a stable aqueous dispersion of synthetic resin, produced by emulsion polymerization, as the principal constituent of the binder.

Lifetime Excess Cancer Risk - The increased probability of contracting cancer, above background levels, due to emissions from a facility, over a 70 year lifetime exposure period.

Listed Compound - Compound or class of compounds listed in Appendix A of the AB 2588 Criteria and Guidelines Regulation pursuant to California Health and Safety Code Section 44321.

Maximum Exposed Individual (MEI) - The receptor location that receives the maximum exposure from an emission source, where homes, businesses, or other places where people spend time are or could be located, whether or not there is an actual receptor at the location. The MEI is generally located outside a facility's property line. The MEI can also be referred to as the Point of Maximum Impact (PMI).

Metallic/Iridescent Topcoat - Any coating which contains more than 5 g/l (0.042 lb/gal) of metal or iridescent particles, as identified on a technical or material safety data sheet, as applied, where such particles are visible in the dried film.

Multi-Stage Topcoat System - A topcoat system composed of either a basecoat/clearcoat system (2 stage), or a basecoat/midcoat/clearcoat system (3-stage).

Nitrocellulose - Another name for cellulose nitrate. The product obtained by treating cellulose with a mixture of nitric and sulfuric acids. It is primarily used in the coatings industry as a base for lacquers.

Overspray - The percent by weight of the solid material in a coating that does not remain on the surface of an object being coated, but is emitted into the ambient air. The percent overspray can be calculated by subtracting the transfer efficiency of the spray equipment from 100%.

Prep Station - Any spraying area that meets the requirements for a "Limited Spraying Area" from Section 45.207 of the Uniform Fire Code and that prevents the escape to the atmosphere of overspray particulate using properly maintained filters and positive mechanical ventilation.

Pretreatment Wash Primer - Any coating which contains a minimum of 0.5% acid, by weight, is necessary to provide surface etching, and is applied directly to bare metal surfaces to provide corrosion resistance and adhesion.

Primer - Any coating which is applied prior to the application of a topcoat for the purpose of corrosion resistance and adhesion of the topcoat.

Primer Sealer - Any coating applied prior to the application of a topcoat for the purpose of corrosion resistance and adhesion of the topcoat, color uniformity, and to promote the ability of an undercoat to resist penetration by the topcoat.

Primer Surfacer - Any coating applied prior to the application of a topcoat for the purpose of corrosion resistance, adhesion of the topcoat, and which promotes a uniform surface by filling in surface imperfections.

Rain Cap - A passive device or partial covering located at the exhaust of a ducting system used to deflect rain, snow, or other solid or liquid materials from entering the ducting system and obstructs the vertical flow of exhaust from the stack.

Receptor - The theoretical or actual endpoint (usually given as a location) of an emission impact.

Reference Exposure Level (REL) - An indication of potential adverse health effects. An REL is a concentration level or dose at or below which adverse health effects are not anticipated. RELs are generally based on the most sensitive adverse health effect reported in the medical and toxicological literature. Additionally, RELs are designed to protect the most sensitive individuals in the population by the inclusion of margins of safety. It should be noted that exceeding the REL does not automatically indicate a health impact.

Relative Dispersion Factor - See X/Q.

Representative Meteorology - At least one complete year of hourly meteorological data that is representative of the project site. Whether a data set is valid and representative of the project site should be determined with the reviewing agency before extensive modeling is performed. Representative data are designed to evaluate the maximum 1-hour concentration as well as longer term average concentrations up to one year (annual).

SCREEN2 - A screening level U.S. EPA dispersion model.

Screening Level Health Risk Assessment - A health risk assessment performed using a screening level dispersion model and other worst case assumptions to arrive at a conservative estimate of potential health risks.

Screening Meteorology - A matrix of wind speed and stability class combinations which are designed to evaluate a wide range of meteorological conditions possible on a 1-hour average basis. The intent is to model all wind speed and stability class combinations possible. In this manner, the worst-case meteorological condition should be evaluated and the maximum 1-hour concentration will be determined. The matrix of wind speed and stability class combinations may be found as inputs to the SCREEN2 model.

Sealer - Coating formulated for and applied to a substrate to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by materials in the substrate.

Significant Health Risk - A health risk estimated through a health risk assessment and determined by a district to be significant pursuant to California Health and Safety Code Section 44362(b).

Solvent - Liquid, usually volatile, which is used in the manufacture of paint to dissolve or disperse the film-forming constituents, and which evaporates during drying and therefore does not become a part or the dried film. Solvents are used to control the consistency and character of the finish and to regulate application properties.

Specialty Coatings - Coatings which are necessary due to unusual and uncommon job performance requirements. these coatings include, but are not limited to, weld-thru primers, adhesion promoters, uniform finish blenders, elastomeric materials, gloss promoters, gloss flatteners, bright metal trim repair, antiglare/safety coatings, impact resistant coatings, rubberized asphaltic underbody coatings, water hold-out coatings, and multicolor coatings that exhibit more than one color when applied from a single container.

Spray Booth - Any power ventilated structure of varying dimensions and construction provided to enclose or accommodate a spraying operation and which meets the Uniform Fire Code. A spray booth shall confine and limit, by dry or wet filtration, the escape to the atmosphere of overspray particulate matter.

Stack - A vertical pipe or flue that exhausts to the atmosphere. A stack can be characterized by a height, diameter, exhaust temperature, velocity, and flow rate.

Surfacer - Pigmented composition for filling minor irregularities to obtain a smooth, uniform surface preparatory to applying finish coats; usually applied over a primer and sandpapered for smoothness.

Top Coat - Any coating applied over a primer or an original OEM finish for the purpose of protection or appearance. Either a basecoat/clearcoat system or a 3-stage coating system is considered jointly as a topcoat.

Transfer Efficiency - The ratio of the weight of coating solids which adhere to the object being coated to the weight amount of coating solids used in the application process, expressed as a percentage.

Uncontrolled Coatings - Coatings formulated to comply with volatile organic compound requirements in district rules that are effective prior to January 1, 1995.

Undercoat - Any pretreatment wash primer, primer, primer surfacer, or primer sealer.

Unit Risk Factor - The estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70 year lifetime. The derivation of the carcinogenic unit risk factor takes into account the available information on pharmacokinetics, mechanism of carcinogenic action, and the effect of different models on low dose extrapolation. These values are generally the 95% upper confidence limit on risk; the actual excess cancer risks are not likely to be higher, and may be lower than those estimated using these procedures.

Volatile Organic Compounds (VOC) - Volatile organic compound means any compound containing at least one atom of carbon, except methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, 1,1,1-trichloroethane, methylene chloride, trichlorofluoromethane (CFC-11), dichlorodifluoromethane (CFC-12), chlorodifluoromethane (HCFC-22), trifluoromethane (HCF-23), 1,1,1-trichloro-2,2,2-trifluoroethane (CFC-113), 1,2-dichloro-1,1,2,2-tetraflouroethane (CFC-114), chloropentafluoroethane (CFC-115), 2,2-dichloro-1,1,1-trifluoroethane (HCFC-123), 2-chlorotetrafluorethane (HCFC-124), pentafluoroethane (HFC-125), 1,1,2,2-tetrafluorothane (HFC-134), 1,1,1,2-tetrafluoroethane (HFC-134a), 1,1-dichloro-1-fluoroethane (HCFC-141b), 1-chloro-1,1-difluoroethane (HCFC-142b), 1,1,1-trifluoroethane (HFC-143a), 1,1-difluoroethane (HFC-152a), and the following four classes of perfluorocarbon (PFC) compounds:

1. cyclic, branched, or linear, completely fluorinated alkanes,
2. cyclic, branched, or linear, completely fluorinated ethers with no unsaturations,
3. cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations, and

4. saturated perfluorocarbons containing sulfur with sulfur bonds only to carbon and fluorine.

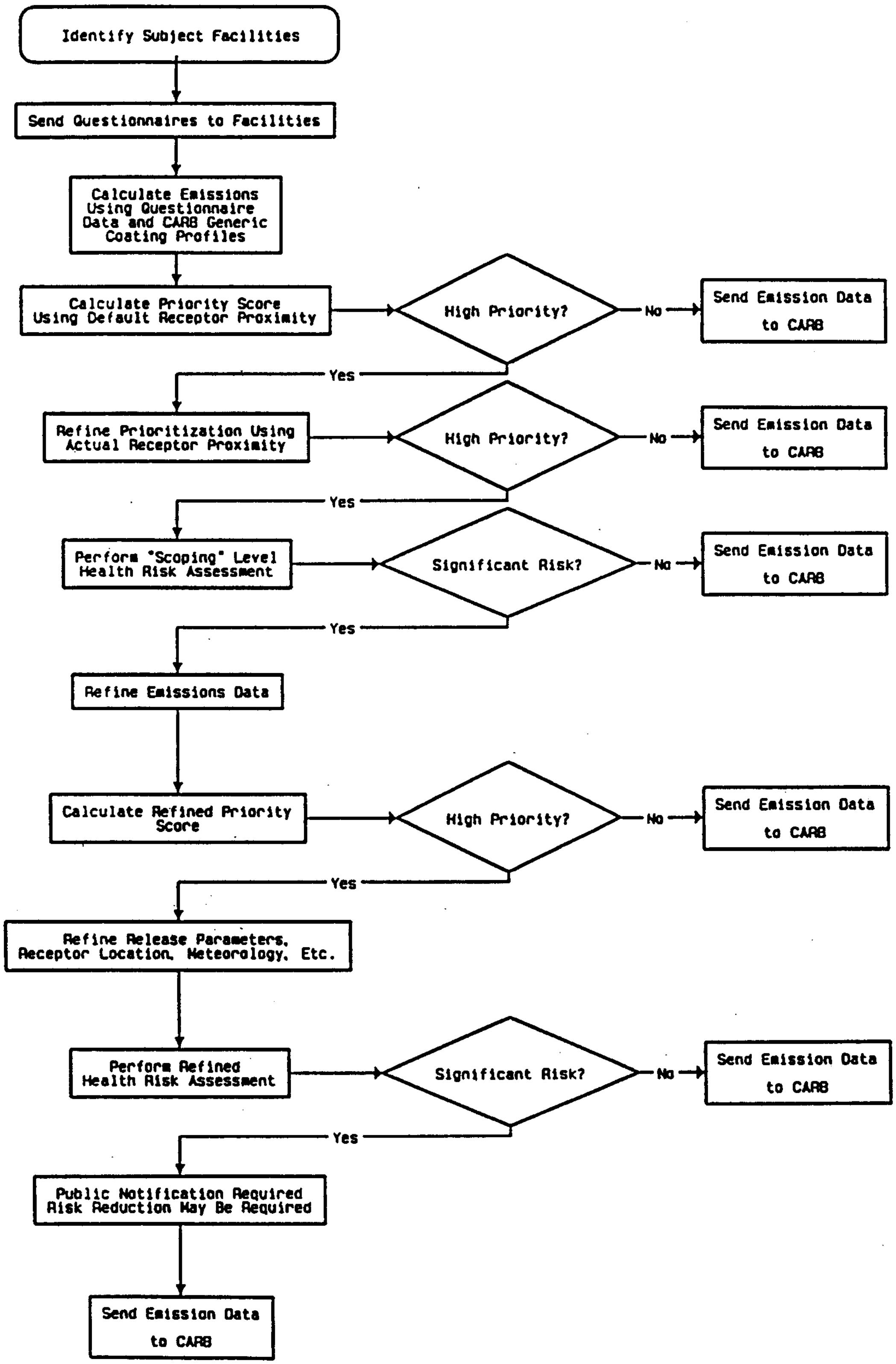
Waterbornes - Latex paints and paints containing water-soluble binders.

Water Curtain - Devices for collecting particulate matter exhausted from paint spray booths or prep stations before it is emitted to the ambient air. Water flows down a baffle plate which enhances the capture of particles and flow washes the particulate matter down to a circulating tank.

Worst-case Meteorology - A particular meteorological scenario which refers to one wind speed, wind direction, ambient air temperature, stability class, and atmospheric mixing height, which results in the calculation of the maximum 1-hour concentration for a given release scenario.

X/Q - A relative dispersion factor, i.e., the predicted concentration of a toxicant based on a unit emission rate of that toxicant. X/Q is usually expressed in units of $\mu g/m^3$ per g/s, and when multiplied by an emission rate in g/s yields a concentration in $\mu g/m^3$.

Appendix B - Flowchart



Appendix C - List of Compounds Addressed in Health Risk Assessment with Toxicity Values

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	TOXICITY DATA FOR CANCER EVALUATIONS: UNIT RISK FACTOR (m^3/ug)	PRELIM. POTENC VALUE (1 (m^3/ug)	MULTIPATHWAY FACTOR (2) CONTR	MULTIPATHWAY FACTOR (2) UNCONTR	ORAL POTENCY VALUE (3) (mg/kg-d)-1	TOXICITY DATA FOR NON-CANCER CHRONIC EVALUATIONS: REL (ug/m^3)	MULTIPATHWAY FACTOR (2) CONTR	MULTIPATHWAY FACTOR (2) UNCONTR	SYSTEM OR ORGAN EFFECTED: CV/BL	CNS/PNS	IMMUN	KIDN	GI/LV	REPR	RESP	ORAL REL (3) (mg/kg-d)	TOXICITY DATA FOR ACUTE EVALUATIONS: ACUTE REL (ug/m^3)	TOXIC ENDPOINT OR TARGET ORGAN: CNS/PNS	IMMUN	REPRO DEV'L	RESP	EYE
CADMIUM AND COMPOUNDS	7440-43-9	4.2E-03	NA	1.00	1.00	NA	3.5E+00	16.86	38.93				X			X (4)	1.0E-03	NA					
CHROMIUM (HEXAVALENT)	18540-29-9	1.4E-01	NA	1.01	1.03	0.42	2.0E-03	1.00	1.00				X	X		X	5.0E-03	NA					
COPPER AND COMPOUNDS	7440-50-8	NA	NA	1.00	1.00		2.4E+00	1.00	1.00							X		1.0E+01 [1.0E+2]				X	
ETHYLBENZENE	100-41-4	NA	NA	1.00	1.00		{1.0E+3}(7)	1.00	1.00						X			NA					
ETHYLENE GLYCOL (MONO)BUTYL ETHER (BUTYL CELLOSOLVE, 2-BUTOXYETHANOL)	111-76-2	NA	NA	1.00	1.00		2.0E+01	1.00	1.00						X	X		1.5E+03 [5.5E+3]			X	X	
ETHYLENE GLYCOL (MONO)-ETHYL ETHER ACETATE		NA	NA	1.00	1.00		6.4E+01	1.00	1.00						X	X		NA					
ISOPROPANOL	67-63-0	NA	NA	1.00	1.00		NA	1.00	1.00									[4.9E+4]				X	X
LEAD AND COMPOUNDS	7439-92-1	1.2E-05	NA	1.00	1.00	NA	1.5E+00	1.00	1.00	X	X	X	X		X			1.5 (8)	X				
METHANOL	67-56-1	NA	NA	1.00	1.00		6.2E+02	1.00	1.00		X							[2.8E+4]	X				
METHYLENE CHLORIDE	75-09-2	1.0E-06	NA	1.00	1.00		3.0E+03	1.00	1.00		X			X				3.5E+03 [8.3E+4]	X				
METHYL ETHYL KETONE	78-93-3	NA	NA	1.00	1.00		{1.0E+3}	1.00	1.00						X			[1.2E+4]				X	
METHYL ISOBUTYL KETONE	108-10-1	NA	NA	1.00	1.00		NA	1.00	1.00									NA					
NICKEL AND NICKEL COMPOUNDS	7440-02-0	2.6E-04	NA NA	1.00	1.00		2.4E-01	1.00	1.00			X	X			X		1.0E+00 [3.3E+0]		X			
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	NA	NA	1.00	1.00		{2.0E+3}	1.00	1.00		X							NA					
STYRENE	100-42-5	NA	5.7E-07	1.00	1.00		7.0E+02	1.00	1.00					X				[2.2E+4]				X	X
TOLUENE	108-88-3	NA	NA	1.00	1.00		2.0E+02	1.00	1.00		X				X			[3.7E+4]				X	
XYLENES (M,O,P ISOMERS)	1210	NA	NA	1.00	1.00		3.0E+02	1.00	1.00						X	X		4.4E+03 [2.2E+3]				X	
ZINC AND COMPOUNDS	7440-66-6	NA	NA	1.00	1.00		3.5E+01	1.00	1.00	X						X		NA					

NOTES:

1. Preliminary potency values should be used at the discretion of the District.
2. Multipathway factors are the ratio of the total risk to inhalation risk. These have been developed using HRA92, version 1.1, a multipathway exposure model developed jointly by the California Air Resources Board and the Office of Environmental Health Hazard Assessment. Assumptions and parameters used to develop the
   Emission rate = 1 g/s
   X/Q = 1
   Deposition velocity = 0.02 m/s for controlled sources and 0.05 m/s for uncontrolled sources
   70-year exposure
   Fraction of homegrown fruits and vegetables consumed = 10%
   Pathways/sources include inhalation, ingestion of soil (pica), homegrown vegetables, mother's milk (for one year) and skin contact.
3. Oral potency values and oral RELs are used in the derivation of multipathway factors.
4. A multipathway factor of 1.00 should be used to calculate the non-cancer chronic hazard index for the respiratory endpoint.
5. NA = Not available.
6. Values in brackets [ ] are proposed and are for informational purposes. Several of the revised acute RELs are higher than the previous values meaning that the acute HHI for the chemical will decrease. The numbers are not official until after Scientific Review Panel review and adoption by OEHHA.
7. The 3 chemicals with values in brackets { } are subject to the Hot Spots Act and RELs for them are being developed by OEHHA. The chronic RELs listed are USEPA Reference Concentrations (RfC). If any of these chemicals drive the chronic Hazard index in a screening risk assessment, OEHHA staff should be consulted for additional guidance.
8. Lead should be evaluated as a sub-chronic or 30-day exposure.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

STATE OF CALIFORNIA

PETE WILSON, Governo

AIR RESOURCES BOARD
2020 L STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

We are requesting your assistance in the development of an industry-wide emission inventory for automotive refinishing emissions in California pursuant to California's Air Toxics "Hot Spots" Information and Assessment Act of 1987. We are specifically requesting automotive coatings formulation data from manufacturers who sell coatings in California. These data will be used to develop an air toxics emission inventory under the guidance of a committee comprised of staffs of local air pollution control districts (coordinated by the California Air Pollution Officers Association, CAPCOA) and the Air Resources Board.

The Hot Spots Act established a statewide program mandating an inventory of air toxics emissions from individual facilities. To reduce the time and effort required to comply with the reporting requirements, the Act allows local air districts to prepare "industry-wide" emission inventories and risk assessments for certain classes of small businesses, as long as specific conditions are met. Because the automotive refinishing industry consists mainly of small businesses which meet the conditions imposed by the Act, with the assistance of coating manufacturers, the districts and the ARB are developing industry-wide emission inventory and risk assessment guidelines for the automotive refinishing industry.

To establish a basis for the industry-wide inventory, and to eliminate duplicative requests to your company from various districts, we plan to condense coating formulation data to create a database of the compositions of common automotive refinishing coatings products. These generic data will be supplied to local districts for this use in a survey of autobody shops in each air district. Businesses will be asked to report the volumes of coatings and solvents applied during the reporting year for a limited number of general product categories.

The enclosed instructions indicate which data fields we are interested in and how to complete the data request. Richard Bode of my staff has been working with you and Jim Sell of the National Paints and Coatings Association to identify data fields and formats. We want to collect these data via spreadsheets.

We ask that you provide the requested data by June 12, 1995, and send your completed diskette to:

California Air Resources Board
Attn: Richard Bode
Technical Support Division
P.O. Box 2815
Sacramento, CA 95812-2815

Thank you for your assistance with this data request. If you have any questions regarding this request, please contact Richard Bode, Manager of the Emissions Inventory Methods Section at (916) 322-3807.

Sincerely,

Terry McGuire, Chief
Technical Support Division

Enclosures

cc: Richard Bode
Jim Sell

SURVEY PACKET CONTENTS

MANUFACTURER'S INFORMATION

Please complete the information on this page, and return this page along with the completed survey diskette to:

California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812-2815
Attn: Richard Bode/TSD

If you have questions, please call:

Richard Bode
California Air Resources Board
Phone: (916) 322-3807
Fax: (916) 323-1075

Company Name: ______________________________

Address: ______________________________

____

Contact Person: ______________ Title: ______________

Phone: ______________ Date: ______________

Type of Spreadsheet Program (ex. Quattro Pro): ______________

Format of data: ______________ Name of Data File: ______________

Comments: ______________________________

____

1

INSTRUCTIONS FOR COMPLETING AUTOBODY COATINGS

MANUFACTURER'S SURVEY

BACKGROUND:

The California Air Resources Board (ARB) is requesting information on volatile organic compound (VOC) content, other organics and toxic constituents in each of the listed categories of coatings used in the automotive refinishing industry in California. Please refer to the attached Definitions of Survey Terms for the definitions of the coating categories. The categories include:

precoat
pretreatment wash primer
primer surfacer
primer sealer
lacquer
metallic/iridescent topcoat
single stage (monocoat) topcoat
base coats
clearcoats
surface cleaners
specialty coatings
miscellaneous, specify - eg. excess amounts of mineral spirits and other thinners not included in the ready to spray products.

Within each major category listed above, you may manufacture several subcategories of coatings based on different chemistries. Please refer to the attached Definitions of Survey Terms for the definitions of the coating subcategories. For example, you may manufacture both a solvent-borne and a waterborne primary sealer, or topcoats based on different polymers. If these subcategories differ greatly in VOC and toxic compound content, please report them separately. We have identified the following subcategories:

solvent-borne
water-borne
South Coast only
others, based on manufacturer's formulations

To ensure that all types of products sold in California are represented, we are requesting information for uncontrolled and controlled formulations. Uncontrolled formulations are coatings formulated for use in a district that does not have a regulation to limit the volatile organic compound (VOC) content. There are two types of controlled formulations: "pre-1995" which are coatings formulated to be compliant with the VOC limits established before 1995 and "post 1995" which are coatings formulated to comply with the VOC limits effective after 1995.

DATA FIELDS

We understand that the product data will be based on ready to spray products as defined in the attached Definitions of Survey Terms. You will be reporting all of the compounds that are in your coating products, therefore, we are not enclosing a list of substances compiled by ARB staff. Please list all formulations separately. Do not aggregate formulas of products containing metals with those products not containing metals.

For uncontrolled, controlled "pre-1995" and controlled "post-1995" formulations please enter the formulations for products in each coating category and subcategory. The following information should be provided:

Stock #\Item # - the number that is used (by the manufacturer) to identify a unique coating.

Trade Name - the common name of the coating listed on the can.

Sales Volume % - the percent sales volume that a particular coating sold in California represents of the total products sold in California. Please report this to the nearest half of a percent. This data should be no older than 1994 and ideally is a projection of 1995 for each of the control categories.

Coating Weight - the weight of each coating in pounds per gallon to three significant figures (X.XX).

Total VOC Content - the total VOC content in pounds per gallon to three significant digits.

Substance Name - the chemical name of the substance. Do not use brand names or combined compound names. Please list metals after the other substances as shown in the example spreadsheet on page 7.

CAS # - Chemical Abstract Number of the substance.

Substance % - the % weight of each compound. Include VOC's, other organics (e.g. 1,1,1-trichloroethane, methylene chloride) and toxics. Please report VOC's and other organics to 1% and toxics (e.g. metals) to 0.1%. We are specifically interested in hexavalent chromium compounds due to their high toxicity. For substances known to be present at levels lower than this, indicate VOC's and other organics as "<1%" if <1% and >.1% and indicate toxics as "<0.1%" if <0.1 and >.01." Please report data that is more accurate than these ranges if it is readily available.

We would like the data fields entered into your spreadsheet in the following order: stock number\item number, trade name, sales volume percent, coating weight, total VOC content, substance name, CAS number, and substance percent. Please refer to the example of the spreadsheet on page 7. Any spreadsheet program can be used. We can accept the data in most formats. However, we prefer that you submit your data in Quattro Pro format. Most spreadsheets can export data into a Quattro Pro format.

DEFINITION OF SURVEY TERMS

California Air Resources Board - Automotive Refinishing Survey

Antiglare/Safety Coating: A coating which minimizes light reflection for safety purposes.

Basecoat: A pigmented topcoat which is the first topcoat applied as part of a multi-stage topcoat system.

Clearcoat: A topcoat which contains no pigments or only transparent pigments and which is the final topcoat applied as a part of a multi-stage topcoat system.

Controlled Coatings: Coatings formulated to comply with volatile organic compound (VOC) requirements in district rules. This category includes coatings formulated to comply with VOC limits established before 1995, as well as coatings formulated to comply with VOC limits set for 1995.

Groundcoat: Porcelain enamel applied directly to the base metal to function as an intermediate layer between the metal and the cover coat. Report as basecoat.

Lacquer: Coating composition which is based on synthetic thermoplastic film-forming material dissolved in organic solvent and which dries primarily by solvent evaporation. Typical lacquers include those based on nitrocellulose, other cellulose derivatives, vinyl resins, acrylic resins, etc.

Latexes: Paint containing a stable aqueous dispersion of synthetic resin, produced by emulsion polymerization, as the principal constituent of the binder.

Metallic/Iridescent Topcoat: Any coating which contains more than 5 g/l (.042 lb/gal) of metal or iridescent particles, as identified on a technical or material safety data sheet, as applied, where such particles are visible in the dried film.

Midcoat: A semi-transparent topcoat which is the middle topcoat applied as part of a three-stage topcoat system. Report as basecoat.

Miscellaneous, specify: A category to be used for products that do not fall into any of the other categories. For example, excess volumes of mineral spirits and other thinners not included in the ready to spray products.

Monocoat: See Single-Stage Topcoat.

Multi-Stage Topcoat System: A topcoat system composed of either a basecoat/clearcoat, a basecoat/midcoat/clearcoat, or a groundcoat/basecoat/midcoat/clearcoat.

Nitrocellulose: Another name for cellulose nitrate. The product obtained by treating cellulose with a mixture of nitric and sulfuric acids. It is primarily used in the coatings industry as a base for lacquers.

Precoat: Any coating which is applied to bare metal primarily to deactivate the metal surface prior to application of a subsequent water-base primer surfacer.

Pretreatment Wash Primer: Any coating which contains a minimum of 0.5% acid by weight, is necessary to provide surface etching and is applied directly to bare metal surfaces to provide corrosion resistance and adhesion.

Primer Sealer: Any coating applied prior to the application of a topcoat for the purpose of corrosion resistance, adhesion of the topcoat, color uniformity, and to promote the ability of an undercoat to resist penetration by the topcoat.

Primer Surfacer: Any coating applied prior to the application of a topcoat for the purpose of corrosion resistance, adhesion of the topcoat, and which promotes a uniform surface by filling in surface imperfections.

Ready to Spray: Thinner and catalyst added by the end user according to manufacturer's instructions on coating container.

Sealer: Coating formulated for and applied to a substrate to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by materials in the substrate.

Single-Stage Topcoat: A coating that has the attributes of both a basecoat and a clearcoat; is applied as a single coating and is meant to be the last coat applied in a coating system.

Solvent: Liquid, usually volatile, which is used in the manufacture of paint to dissolve or disperse the film-forming constituents, and which evaporates during drying and therefore does not become a part of the dried film. Solvents are used to control the consistency and character of the finish and to regulate application properties.

Solvent-borne: Coatings which contain solvent as the carrier.

South Coast only: Coatings that meet South Coast Rule 1151.

Speciality Coatings: Unique coatings and compliant coatings with additives which are necessary due to unusual job performance requirements. These coatings include, but are not limited to weld-thru primers, adhesion promoters, uniform finish blenders, elastomeric materials, gloss flatteners, bright metal trim repair, and antiglare/safety coatings.

Surfacer: Pigmented composition for filling minor irregularities to obtain a smooth, uniform surface preparatory to applying finish coats; usually applied over a primer and sandpapered for smoothness.

Surface Cleaner: A solvent applied before undercoats or any other stages that is used to insure the surface is free of wax, dirt, or other contaminants.

Top Coat: Is a coating applied over other coatings in a coating system; usually applied over a primer, undercoaters or surfacers; generally for the purpose of appearance, identification, or protection.

Top Coat: Is a coating applied over other coatings in a coating system; usually applied over a primer, undercoaters or surfacers; generally for the purpose of appearance, identification, or protection.

Uncontrolled Coatings: Coatings formulated for use in a district that do not have a regulation that limits the volatile organic compound (VOC) content of coatings used for automobile refinishing.

Volatile Organic Compounds (VOC): Volatile organic compound means any compound containing at least one atom of carbon, <u>except</u> methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, 1,1,1-trichloroethane, methylene chloride, trichlorofluoromethane (CFC-11), dichlorodifluoromethane (CFC-12), chlorodifluoromethane (HCFC-22), trifluoromethane (HCF-23), 1,1,1-trichloro-2,2,2,-trifluoroethane (CFC-113), 1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114), chloropentafluoroethane (CFC-115), 2,2-dichloro-1,1,1-trifluoroethane (HCFC-123), 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124), pentafluoroethane (HFC-125), 1,1,2,2-tetrafluorethane (HFC-134), 1,1,1,2-tetrafluoroethane (HFC-134a), 1,1-dichloro-1-fluoroethane (HCFC-141b), 1-chloro-1,1-difluoroethane (HCFC-142b), 1,1,1-trifluoroethane (HFC-143a), 1,1-difluoroethane (HFC-152a), and the following four classes of perfluorocarbon (PFC) compounds:

(1) cyclic, branched, or linear, completely fluorinated alkanes;
(2) cyclic, branched, or linear, completely fluorinated eithers with no unsaturations;
(3) cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations, and,
(4) saturated perfluorocarbons containing sulfur with sulfur bonds only to carbon and fluorine.

Waterbornes: Latex paints and paints containing water-soluble binders or water-dispersed binder.

			AUTOBODY PAINT MANUFACTURER'S SURVEY			
			UNCONTROLLED FORMULATIONS - Projected 1995 SALES if possible			
COATINGS						
Coating Category	Stock #/Item #	Trade Name	Sales Volume %	Coating Weight	Total VOC Content	
Subcategory				lbs / ga	lbs / ga	
PRECOAT						
Solvent-borne						
	1120	Xxxxx Yyyyy	10.5	6.01	3.02	
Substances						
VOC's						
Substance Name	CAS #	Substance %				
		(weight)				
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
OTHER ORGANICS						
1,1,1-trichloroethane						
methylene chloride						
Xxxxxx xxxxxx						
METALS						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
PRECOAT						
Solvent-borne						
	1125	Yyyyy Zzzzz	50.0	4.43	1.25	
Substances						
VOC's						
Substance Name	CAS #	Substance %				
		(weight)				
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
OTHER ORGANICS						
1,1,1-trichloroethane						
methylene chloride						
Xxxxxx xxxxxx						
METALS						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
etc.						

			AUTOBODY PAINT MANUFACTURER'S SURVEY			
			CONTROLLED "PRE - 1995" - PROJECTED 1995 SALES if possible			
COATINGS						
Coating Category	Stock #/Item #	Trade Name	Sales Volume %	Coating Weight	Total VOC Content	
Subcategory				lbs / ga	lbs / ga	
PRIMER SEALER						
Solvent-borne						
	3142	Aaaaa Bbbbbb	25.5	5.55	1.33	
Substances						
VOC's						
Substance Name	CAS #	Substance % (weight)				
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
OTHER ORGANICS						
1,1,1-trichloroethane						
methylene chloride						
Xxxxxx xxxxxx						
METALS						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
PRIMER SEALER						
Solvent-borne						
	3120	Ccccc Dddddd	30.0	4.85	2.15	
Substances						
VOC's						
Substance Name	CAS #	Substance % (weight)				
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
OTHER ORGANICS						
1,1,1-trichloroethane						
methylene chloride						
Xxxxxx xxxxxx						
METALS						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
etc.						

			AUTOBODY PAINT MANUFACTURER'S SURVEY			
			CONTROLLED "POST - 1995" - PROJECTED 1995 SALES if possi			
COATINGS						
Coating Category	Stock #/Item #	Trade Name	Sales Volume %	Coating Weight	Total VOC Content	
Subcategory				lbs / ga	lbs / ga	
METALLIC TOPCOAT						
Solvent-borne						
	4000	Winter Green	45.0	5.95	0.875	
Substances						
VOC's						
Substance Name	CAS #	Substance %				
		(weight)				
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
OTHER ORGANICS						
1,1,1-trichloroethane						
methylene chloride						
Xxxxxx xxxxxx						
METALS						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
METALLIC TOPCOAT						
Solvent-borne						
	4002	Pearl Garnet	75.0	5.95	1.05	
Substances						
VOC's						
Substance Name	CAS #	Substance %				
		(weight)				
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
OTHER ORGANICS						
1,1,1-trichloroethane						
methylene chloride						
Xxxxxx xxxxxx						
METALS						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
Xxxxxx xxxxxx						
etc.						

(d) Each district may recover administrative costs to the district of collecting the fees pursuant to these regulations. At the request of the State Board, a district shall provide to the State Board, within 30 days of the request, substantiation of administrative costs.

NOTE: Authority cited: Sections 39600, 39601 and 39612, Health and Safety Code. Reference: Sections 39002, 39500, 39600 and 39612, Health and Safety Code.

HISTORY

1. New section filed 10-6-89; operative 11-5-89 (Register 89, No. 43).
2. Amendment to subsections (c) and (d) filed 3-6-91; operative 3-6-91 pursuant to Government Code section 11346.2 (Register 91, No. 14).
3. Editorial correction of printing error in subsection (a) (Register 92, No. 2).

§ 90803. Failure of Facility to Pay Fees.

In the event any district is unable to collect the assessed fee from any source due to circumstances beyond the control of the district, including but not limited to facility closure, emission quantification errors, or refusal of the operator to pay despite permit revocation and/or other enforcement action, such district shall notify the Executive Officer of the State Board. For demonstrated good cause, the district may be relieved from that portion of the fees the district is required to collect and remit to the state as set forth in section 90800 or section 90800.1 or section 90800.2 or section 90800.3 or section 90800.4 or section 90800.5. Nothing herein shall relieve the operator from any obligation to pay any fees assessed pursuant to this regulation.

NOTE: Authority cited: Section 39600, 39601 and 39612, Health and Safety Code. Reference: Sections 39002, 39500, 39600 and 39612, Health and Safety Code.

HISTORY

1. New section filed 10-6-89; operative 11-5-89 (Register 89, No. 43).
2. Amendment filed 3-6-91; operative 3-6-91 pursuant to Government Code section 11346.2 (Register 91, No. 14).
3. Amendment filed 9-18-91; operative 10-18-91 (Register 92, No. 2).
4. Amendment filed 8-11-92; operative 9-10-92 (Register 92, No. 33).
5. Amendment filed 6-15-93; operative 7-1-93 (Register 93, No. 25).
6. Amendment filed 11-28-94; operative 12-28-94 (Register 94, No. 48).

Subchapter 4. Disclosure of Public Records

Article 1. General

§ 91000. Scope and Purpose.

This subchapter shall apply to all requests to the state board under the California Public Records Act (Government Code Sections 6250 et seq.) for the disclosure of public records or for maintaining the confidentiality of data received by the state board. Written guidelines shall govern the internal review of such requests.

NOTE: Authority cited: Sections 39600 and 39601(a), Health and Safety Code. Reference: California Public Records Act, Chapter 3.5 (commencing with Section 6250), Division 7, Government Code.

HISTORY

1. New Subchapter 4 (Sections 91000 through 91022, not consecutive) filed 1-26-73; effective thirtieth day thereafter (Register 73, No. 4).
2. Amendment filed 9-28-73; effective thirtieth day thereafter (Register 73, No. 39).
3. Amendment of NOTE filed 3-18-77; effective thirtieth day thereafter (Register 77, No. 12).
4. Repealer and new section filed 10-5-82; effective thirtieth day thereafter (Register 82, No. 41).

§ 91001. Disclosure Policy.

It is the policy of the state board that all records not exempted from disclosure by state law shall be open for public inspection with the least possible delay and expense to the requesting party.

HISTORY

1. Amendment filed 9-28-73; effective thirtieth day thereafter (Register 73, No. 39).
2. Amendment and new NOTE filed 3-18-77; effective thirtieth day thereafter (Register 77, No. 12).
3. Repealer and new section filed 10-5-82; effective thirtieth day thereafter (Register 82, No. 41).

Article 2. Board's Requests for Information

§ 91010. Request Procedure.

The state board shall give notice to any person from whom it requests information that the information provided may be released (1) to the public upon request, except trade secrets which are not emission data or other information which is exempt from disclosure or the disclosure of which is prohibited by law, and (2) to the federal Environmental Protection Agency, which protects trade secrets as provided in Section 114(c) of the Clean Air Act and amendments thereto (42 USC 7401 et seq.) and in federal regulations.

NOTE: Authority cited: Sections 39600, 39601 and 39602, Health and Safety Code. Reference: Sections 39701, 41510, 41511, 41512 and 42705, Health and Safety Code; and Section 6253, Government Code.

HISTORY

1. Amendment of subsections (a) and (b) filed 9-28-73; effective thirtieth day thereafter (Register 73, No. 39).
2. Amendment of subsection (a), (b) and (c), and new NOTE, filed 3-18-77; effective thirtieth day thereafter (Register 77, No. 12).
3. Amendment filed 10-5-82; effective thirtieth day thereafter (Register 82, No. 41).
4. Editorial correction filed 5-7-84; effective thirtieth day thereafter (Register 84, No. 19).

§ 91011. Submissions of Confidential Data.

Any person submitting to the state board any records containing data claimed to be "trade secret" or otherwise exempt from disclosure under Government Code Section 6254 or 6254.7 or under other applicable provisions of law shall, at the time of submission, identify in writing the portions of the records containing such data as "confidential" and shall provide the name, address and telephone number of the individual to be contacted if the state board receives a request for disclosure of or seeks to disclose the data claimed to be confidential. Emission data shall not be identified as confidential. The state board shall not disclose data identified as confidential, except in accordance with the requirements of this subchapter or Section 39660(e) of the Health and Safety Code.

NOTE: Authority cited: Sections 39600 and 39601, Heath and Safety Code. Reference: Sections 39660, 39701, 41500, 41511, 41512 and 42705, Health and Safety Code; Sections 6253, 6254 and 6254.7, Government Code; *Natural Resources Defense Council v. EPA*, 489 F.2d 390 (5th Cir. 1974) (6 ERC 1248); *Northern California Police Practices Project v. Craig* (1979) 90 Cal.App.3d 116; *Uribe v. Howie* (1971) 19 Cal.App.3d 194.

HISTORY

1. New section filed 10-5-82; effective thirtieth day thereafter (Register 82, No. 41). For history of former section, see Register 73, No. 39.
2. Amendment filed 7-10-84; effective thirtieth day thereafter (Register 84, No. 28).

Article 3. Inspection of Public Records

§ 91020. Disclosure Policy.

HISTORY

1. Repealer filed 10-5-82; effective thirtieth day thereafter (Register 82, No. 41).

§ 91021. Disclosure Procedure.

NOTE: Authority cited: Section 39601, Health and Safety Code. Reference: Sections 6253-6257, Government Code.

HISTORY

1. Amendment of subsections (c) and (d)(3) filed 9-28-73; effective thirtieth day thereafter (Register 73, No. 39).
2. Amendment and new NOTE filed 3-18-77; effective thirtieth day thereafter

§ 91022. Disclosure of Confidential Data.

(a) This section shall apply to all data in the custody of the state board

(1) designated "trade secret" prior to the adoption of this subchapter,

(2) considered by the state board or identified by the person who submitted the data as confidential pursuant to this subchapter, or

(3) received from a federal, state or local agency, including an air pollution control district, with a confidential designation, subject to the following exceptions:

(A) Except for the time limits specifically provided in subsection (b), only subsections (c) and (d) of this section shall apply to information submitted pursuant to Health and Safety Code Section 39660(e).

(B) Appropriate portions of an application for approval, accreditation, or certification of a motor vehicle emission control device or system shall be kept confidential until such time as the approval, accreditation, or certification is granted, at which time the application (except for trade secret data) shall become a public record, except that estimates of sales volume of new model vehicles contained in an application shall be kept confidential for the model year, and then shall become public records. If an application is denied, it shall continue to be confidential but shall be subject to the provisions of this section.

(C) If disclosure of data obtained after August 9, 1984 from a state or local agency subject to the provisions of the Public Records Act is sought, the state board shall request that the agency which provided the data determine whether it is confidential. The state board shall request that it be notified of the agency's determination within ten days. The state board shall not release the data if the agency determines that it is confidential and so notifies the state board; provided, however, that the data may be released with the consent of the person who submitted it to the agency from which it was obtained by the state board.

(b) Upon receipt of a request from a member of the public that the state board disclose data claimed to be confidential or if the state board itself seeks to disclose such data, the state board shall inform the individual designated pursuant to Section 91011 by telephone and by mail that disclosure of the data is sought. The person claiming confidentiality shall file with the state board documentation in support of the claim of confidentiality. The documentation must be received within five (5) days from the date of the telephone contact or of receipt of the mailed notice, whichever first occurs. In the case of information submitted pursuant to Health and Safety Code Section 39660(e), the documentation must be received within 30 days of the date notice was mailed pursuant to that section. The deadlines for filing the documentation may be extended by the state board upon a showing of good cause made within the deadline specified for receipt of the documentation.

(c) The documentation submitted in support of the claim of confidentiality shall include the following information:

(1) the statutory provision(s) under which the claim of confidentiality is asserted;

(2) a specific description of the data claimed to be entitled to confidential treatment;

(3) the period of time for which confidential treatment is requested;

(4) the extent to which the data has been disclosed to others and whether its confidentiality has been maintained or its release restricted;

(5) confidentiality determinations, if any, made by other public agencies as to all or part of the data and a copy of any such determinations, if available; and

(6) whether it is asserted that the data is used to fabricate, produce, or compound an article of trade or to provide a service and that the disclosure of the data would result in harmful effects on the person's competitive position, and, if so, the nature and extent of such anticipated harmful effects.

(d) Documentation, as specified in subsection (c), in support of a claim of confidentiality may be submitted to the state board prior to the time disclosure is sought.

(e) The state board shall, within ten days of the date of the request, or within 20 days of that date if the state board determines that there are unusual circumstances as defined in Government Code Section 6256.1, review the request, if any, and supporting documentation, if received within the time limits specified in subsection (b) above, including any extension granted, and determine whether the data is entitled to confidential treatment pursuant to Government Code Section 6254, 6255 or 6254.7 or other applicable provisions of law and shall either:

(1) decline to disclose the data and, if a request was received, provide to the person making the request and to the person claiming the data is confidential a justification for the determination pursuant to Government Code Section 6255; or

(2) provide written notice to the person claiming the data is confidential and, if a request was received, to the person requesting the data that it has determined that the data is subject to disclosure, that it proposes to disclose the data, and that the data shall be released 21 days after receipt of the notice by the person claiming confidentiality, unless the state board is restrained from so doing by a court of competent jurisdiction. The state board shall release the data in accordance with the terms of the notice unless so restrained.

(f) Should judicial review be sought of a determination issued in accordance with subsection (e), either the person requesting data or the person claiming confidentiality, as appropriate, may be made a party to the litigation to justify the determination.

NOTE: Authority cited: Section 39601, Health and Safety Code. Reference: Sections 6253, 6254, 6254.7, 6255, 6256, 6256.1, 6258 and 6259, Government Code.

HISTORY

1. Amendment of subsections (a) and (b) filed 9-28-73; effective thirtieth day thereafter (Register 73, No. 39).
2. Amendment and new NOTE filed 3-18-77; effective thirtieth day thereafter (Register 77, No. 12).
3. Amendment filed 10-5-82; effective thirtieth day thereafter (Register 82, No. 41).
4. Editorial correction of subsection (a) filed 5-7-84; effective thirtieth day thereafter (Register 84, No. 19).
5. Amendment filed 7-10-84; effective thirtieth day thereafter (Register 84, No. 28).

Subchapter 5. Emission Data, Sampling, and Credentials for Entry

Article 1. Determination of Emissions

§ 91100. Emission Data and Sampling Access.

The Executive Officer of the Air Resources Board (State Board) or his or her authorized representative may, upon reasonable written notice, require the owner or operator of any substance, article, machine, equipment, or other contrivance, the use of which may cause the issuance of air contaminants, or the use of which may eliminate, reduce or control the issuance of air contaminants, to:

(a) Provide the State Board with descriptions of basic equipment, control equipment and rates of emissions. Where this information does not provide sufficient data for the State Board to carry out the purposes of Division 26 of the Health and Safety Code, or where such information is in question, the Executive Officer or his or her authorized representative may require such other additional information as may be necessary, including process and production data, techniques and flow diagrams.

(b) Provide sampling platforms, sampling ports, and means of access to sampling locations.

(c) Provide and maintain sampling and monitoring apparatus to measure emissions or air contaminants when the Executive Officer or his or her authorized representative has determined that such apparatus is avail-

Appendix E

Estimation of Generic Automotive Coating Formulation

Generic coating formulations were calculated for each coating type (e.g., clearcoats) for each automotive coatings manufacturer. The generic coating formulations represent average air toxics composition for each coating type. The generic coating formulations were calculated based on specific substance compositions for each coating product within a coating type and weighted based on each manufacturers percentage of sales from each coating product. They therefore represent sales-weighted average compositions. Data were obtained from a survey of six automotive coatings manufacturers for formulation data for each of their automotive coating products (See survey letter, Appendix D). PPG's data was not sales weighted, but was averaged using the statistical mean of the data for each category.

The sales weighted average compositions can be used to estimate the weighted average uncontrolled emissions for the ready to spray formulation for each substance in units of pounds per coating type. For example, to estimate the toluene emissions from the *Ubreakem Wefixem Body Shop* using *Paint The World's* clearcoats, first obtain the number of gallons of clearcoats that *Ubreakem Wefixem Body Shop* used in 1995. From the generic formulation table for clearcoats of the *Paint The World*, obtain the weighed average substance composition for toluene. Multiply the number of gallons of clearcoats sprayed by the weighted average substance composition for toluene (lb per gallon) to obtain the toluene emissions in pounds (See example below).

Example:

PR = The number of gallons of clearcoats = 100 gallons/year

$WASC_{toluene}$ = The weighted average substance composition factor = 0.50 lb/gallon

$$E_{toluene} = PR \times WASC_{toluene}$$
$$= 100 \text{ gallon/year} \times 0.50 \text{ lb/gallon}$$
$$= 50 \text{ lb/year}$$

MANUFACTURER : PAINT THE WORLD
CATEGORY : Clearcoats
YEAR : 1995

Toxic ID (CAS)	INGREDIENTS	Wt. Ave (lb/gal)
100414	Ethylbenzene	0.32
107982	Propylene Glycol Methyl Ether	0.04
108101	Methyl Isobutyl Ketone	0.21
108656	Propylene Glycol Monomethyl Ether Acetate	0.89
108883	Toluene	0.38
112072	Ethylene Glycol Monobutyl Ether Acetate	0.15
67561	Methyl Alcohol	0.18
67630	Isopropyl Alcohol	0.80
67641	Acetone	1.26
78933	Methyl Ethyl Ketone	0.26

Manufacturer : Dupont

Category : Pretreatment Wash Primers

Year : 1995

Appendix E

Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67561	Methyl Alcohol	0.13
67630	Isopropyl Alcohol	0.63
67641	Acetone	1.07
108101	Methyl Isobutyl Ketone	0.13
108656	Propylene Glycol Monomethyl Ether Acetate	0.38
108883	Toluene	0.57
13530659	Zinc Chromate	0.06

Manufacturer : Dupont

Category : Metal Treatments

Year : 1995

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	3.33
111762	Ethylene Glycol Monobutyl Ether	0.59

Manufacturer : Dupont

Category : Precoat

Year : 1995

Appendix E

No Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67561	Methyl Alcohol	0.10
67630	Isopropyl Alcohol	0.47
67641	Acetone	0.37
78933	Methyl Ethyl Ketone	0.52
107982	Propylene Glycol Methyl Ether	0.16
108101	Methyl Isobutyl Ketone	0.21
108656	Propylene Glycol Monomethyl Ether Acetate	0.21
108883	Toluene	0.63
112072	Ethylene Glycol Monobutyl Ether Acetate	0.10

Manufacturer : Dupont

Category : Precoat

Year : 1995

Appendix E

Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	0.37
67641	Acetone	0.10
107982	Propylene Glycol Methyl Ether	0.63
108883	Toluene	0.26
1314132	Zinc Oxide	0.10
1330207	Xylene	2.35
13530659	Zinc Chromate	0.58

Manufacturer : Dupont

Category : Primer Surfacer

Year : 1995

Appendix E

No Lead No Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
78933	Methyl Ethyl Ketone	0.13
112072	Ethylene Glycol Monobutyl Ether Acetate	0.10
1330207	Xylene	0.08
7440666	Zinc Molybdate And Zinc Oxide	0.05

Manufacturer : Dupont

Category : Primer-Sealers

Year : 1995

Appendix E

Lead Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal).
1314132	Zinc Oxide	0.36
1330207	Xylene	1.62
61790145	Lead Napthenate	0.04

Manufacturer : Dupont

Category : Primer-Sealers

Year : 1995

Appendix E

No Lead or Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal).
67561	Methyl Alcohol	0.23
67630	Isopropyl Alcohol	0.55
67641	Acetone	0.96
78933	Methyl Ethyl Ketone	0.35
108656	Propylene Glycol Monomethyl Ether Acetate	0.12
108883	Toluene	1.16

Manufacturer : Dupont

Appendix E

Category : Single Stage Topcoats

Year : 1995

No Lead No Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	0.23
67641	Acetone	0.10
78933	Methyl Ethyl Ketone	0.11
108883	Toluene	0.38
112072	Ethylene Glycol Monobutyl Ether Acetate	0.10
1330207	Xylene	0.74

Manufacturer : Dupont

Appendix E

Category : Single Stage Topcoats

Year : 1995

Lead & Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
78933	Methyl Ethyl Ketone	0.17
108656	Propylene Glycol Monomethyl Ether Acetate	0.21
112072	Ethylene Glycol Monobutyl Ether Acetate	0.00
1330207	Xylene	0.25
12656858	Lead Chromate Molybdate	0.36
18454121	Lead Chromate	0.42

Manufacturer : Dupont

Appendix E

Category : Multistage Topcoats

Year : 1995

No Lead No Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	0.32
67641	Acetone	0.65
78933	Methyl Ethyl Ketone	0.21
108101	Methyol Isobutyl Ketone	0.18
108656	Propylene Glycol Monomethyl Ether Acetate	0.95
108883	Toluene	0.66
112072	Ethylene Glycol Monobutyl Ether Acetate	0.12
1330207	Xylene	0.68

Manufacturer : Dupont

Category : Multistage Topcoats

Year : 1995

Lead & Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	0.29
67641	Acetone	0.43
78933	Methyl Ethyl Ketone	0.20
108101	Methyl Isobutyl Ketone	0.55
108656	Propylene Glycol Monomethyl Ether Acetate	0.26
108883	Toluene	0.37
112072	Ethylene Glycol Monobutyl Ether Acetate	0.25
1330207	Xylene	0.36
12656858	Lead Chromate Molybdate	0.64
18454121	Lead Chromate	0.20
61790145	Lead Napthenate	0.00

Manufacturer : Dupont

Appendix E

Category : Clearcoats

Year : 1995

No Lead No Chromium Formulation

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67561	Methyl Alcohol	0.14
67630	Isopropyl Alcohol	0.60
67641	Acetone	0.95
78933	Methyl Ethyl Ketone	0.26
100414	Ethylbenzene	0.30
107982	Propylene Glycol Methyl Ether	0.09
108101	Methyl Isobutyl Ketone	0.22
108656	Propylene Glycol Monomethyl Ether Acetate	0.78
108883	Toluene	0.34
112072	Ethylene Glycol Monobutyl Ether Acetate	0.15
1330207	Xylene	0.70

Manufacturer : Dupont

Category : Solvent Cleaners

Year : 1995

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	0.59
67641	Acetone	1.98
108883	Toluene	0.95

Manufacturer : Dupont

Category : Waterborne Cleaners

Year : 1995

Toxic ID (CAS)	Ingredients	Wt. Ave (lb/gal)
	Aliphatic Hydrocarbon/Aliphatic Ester/Surfactant	0.02
	Aliphatic Solvent Mixture	0.04
	Water	0.49

Manufacturer : Nason

Appendix E

Category : Pretreatment Wash Primer
Year : 1995

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
78933	Methyl Ethyl Ketone	1.02
108101	Methyl Isobutyl Ketone	0.42
13530659	Zinc Chromate	0.36

Manufacturer : Nason

Appendix E

Category : Precoats
Year : 1995

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	.14
67641	Acetone	.29
78933	Methyl Ethyl Ketone	.58
108883	Toluene	.38
1330207	Xylene	.19

Manufacturer : Nason

Appendix E

Category : Primers
Year : 1995

Toxic	Ingredient	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	0.14
78933	Methyl Ethyl Ketone	0.16
107982	Propylene Glycol Methyl Ether	0.58
108656	Propylene Glycol Monomethyl Ether Acetate	0.24
108883	Toluene	0.20
1330207	Xylene	0.10

Manufacturer : Nason

Appendix E

Category : Sealers
Year : 1995

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	0.21
108101	Methyl Isobutyl Ketone	0.39
108883	Toluene	0.26
1330207	Xylene	0.10

Manufacturer : Nason

Appendix E

Category : Single Stage Topcoats
Year : 1995

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
67630	Isopropyl Alcohol	0.10
67641	Acetone	0.13
78933	Methyl Ethyl Ketone	0.07
108656	Propylene Glycol Monomethyl Ether Acetate	0.07
108883	Toluene	0.14
112072	Ethylene Glycol Monobutyl Ether Acetate	0.10
1330207	Xylene	0.08

Manufacturer : Nason

Appendix E

Category : Clear
Year : 1995

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
108101	Methyl Isobutyl Ketone	0.66
108656	Propylene Glycol Monomethyl Ether Acetate	0.22
1330207	Xylene	0.22

Manufacturer : Sherwin Williams
Category : Pretreatment

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
111762	2 butoxyethanol	0.32
67630	2 propanol	1.79
111762	2butoxyethanol	0.29
112072	2butoxyethyl acetate	0.06
67641	acetone	0.24
100414	ethylbenzene	0.35
67561	methanol	0.06
78933	methyl ethyl ketone	0.42
108101	methyl isobutyl ketone	1.23
108883	toluene	0.27
7440666	zinc compounds	0.13

Manufacturer : Sherwin Williams

Appendix E

Category : Precoat

Chromium Formulation

Toxic ID (CAS)	Ingredient	wt. Ave (lb/gal)
112072	2 butoxyethyl acetate	0.10
18540299	chromium compounds	0.05
100414	ethylbenzene	0.14
78933	methyl ethyl ketone	0.14
108101	methyl isobutyl ketone	0.48
7789062	strontium chromate	0.24
1330207	xylene	0.72

Manufacturer : Sherwin Williams

Appendix E

Category : Precoat

Toxic ID (CAS)	Ingredient	wt. Ave (lb/gal)
108656	1 methoxy 2 propanol acetate	0.10
111762	2 butoxyethanol	0.10
67630	2 propanol	0.24
100414	ethylbenzene	0.08
78933	methyl ethyl ketone	0.19
108101	methyl isobutyl ketone	0.36
108883	toluene	0.91
1330207	xylene	0.43
7440666	zinc compounds	0.29

Manufacturer : Sherwin Williams
Category : Primer Sealers

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
108656	1 methoxy 2 propanol acetate	0.03
112072	2 butoxyethyl acetate	0.03
67630	2-propanol	0.48
67641	acetone	0.18
18540299	chromium compounds	0.01
100414	ethylbenzene	0.32
78933	methyl ethyl ketone	0.13
108101	methyl isobutyl ketone	0.36
108883	toluene	1.72
7440666	zinc compounds	0.03

Manufacturer : Sherwin Williams
Category : Primer Surfacer

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
108656	1 methoxy 2 propanol acetate	0.05
67630	2 propanol	0.30
67641	acetone	0.47
100414	ethylbenzene	0.05
67561	methanol	0.12
108101	methyl isobutyl ketone	0.49
100425	styrene	0.00
108883	toluene	2.34

Manufacturer : Sherwin Williams

Category : Color Coats

Appendix E

Lead & Chromium Formulation

Toxic ID (CAS).	Ingredient	Wt. Ave (lb/gal)
108656	1-methoxy-2-propanol acetate	0.14
111762	2 butoxyethanol	0.07
112072	2-butoxyethyl acetate	0.23
67630	2-propanol	0.51
67641	acetone	0.46
18540299	chromiumcompounds	0.42
100414	ethylbenzene	0.28
1128	lead compounds	0.69
67561	methanol	0.17
78933	methyl ethyl ketone	1.11
108101	methyl isobutyl ketone	0.50
108883	toluene	0.86
1330207	xylene	1.34

Manufacturer : Sherwin Williams

Category : Color Coats

Appendix E

Toxic ID (CAS)	Ingredient	Wt. Ave (lb/gal)
1330207	xylene	0.07

Manufacturer : Sherwin Williams
Category : Clearcoats

Toxic ID (CAS).	Ingredient	Wt. Ave. (lb/gal)
108656	1-methoxy-2-propanol acetate	0.19
112072	2-butoxyethyl acetate	0.52
67630	2-propanol	0.58
67641	acetone	0.71
100414	ethylbenzene	0.16
67561	methanol	0.13
78933	methyl ethyl ketone	0.80
108101	methyl isobutyl ketone	0.38
108883	toluene	1.13

Manufacturer : Akzo
Category : Surface Cleaners

Toxic	Ingredient	Weighted Ave.
67641	Acetone	1.8960
100414	Ethyl benzene	.3899
108101	Methyl isobutyl ketone {Hexone}	3.7620
108883	Toluene	3.1050
1330207	Xylene	1.6621

Manufacturer : Akzo
Category : Primer Surfacer

Toxic	Ingredient	Weighted Ave.
100414	Ethyl benzene	.0167
107982	Propylene glycol monomethyl ether	.4204
108101	Methyl isobutyl ketone {Hexone}	.7536
108656	Propylene glycol monomethyl ether acetate	.1103
111762	Ethylene glycol monobutyl ether	.0623
112072	2-butoxyethyl acetate	.0100
1330207	Xylene	.4769

Manufacturer : Akzo
Category : Single Stage Topcoat

Toxic	Ingredient	Weighted Ave.
100414	Ethyl benzene	.0018
108656	Propylene glycol monomethyl ether acetate	.0253
1330207	Xylene	.0762

Formulations without Lead or Chromium

Manufacturer : Akzo
Category : Lacquer

Toxic	Ingredient	Weighted Ave.
67630	Isopropyl alcohol	.1698
67641	Acetone	.3000
108656	Propylene glycol monomethyl ether acetate	.1164
108883	Toluene	1.4394
112072	2-butoxyethyl acetate	.0690
1330207	Xylene	.7092

Chromium Compounds

Manufacturer : Akzo
Category : Specialty Coating

APPENDIX E

Toxic	Ingredient	Wt. Ave. (lb/gal)
111762	Ethylene glycol monobutyl ether	.0083
1308389	chromium oxide	.0092

Formulations without Lead or Chromium

Manufacturer : Akzo
Category : Specialty Coating

APPENDIX E

Toxic	Ingredient	Weighted Ave.
1330207	Xylene	1.1491
7440439	Cadmium	.0006
7440666	Zinc	.0014

Manufacturer : Akzo
Category : Specialty Coating

Toxic	Ingredient	Weighted Ave.
67630	Isopropyl alcohol	.1524
67641	Acetone	1.0406
100414	Ethyl benzene	.4332
107982	Propylene glycol monomethyl ether	1.2990
108656	Propylene glycol monomethyl ether acetate	.8559
108883	Toluene	.5155
111762	Ethylene glycol monobutyl ether	.0396
112072	2-butoxyethyl acetate	1.0860

Company Name: PPG

Category : PRIMER SEALER

Toxic Id	Ingredient	Ave (lb/gal)
67630	ISOPROPYL ALCOHOL	0.00
67641	ACETONE	0.19
78933	METHYL ETHYL KETONE	0.19
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.22
108101	METHYL ISOBUTYL KETONE	0.54
108883	TOLUENE	0.19
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.01
1330207	XYLENE	0.53

Company name : PPG
Category : DTM PRIMER

Toxic Id	Ingredient	Ave (lb/gal)
67630	ISOPROPYL ALCOHOL	0.10
67641	ACETONE	0.03
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.43
108101	METHYL ISOBUTYL KETONE	0.45
108883	TOLUENE	0.63
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.21
1330207	METHYL ETHYL KETONE	0.26
1330207	XYLENE	0.24
18540299	CHROMIUM VI	0.00

Category : PRIMER SURFACER

Toxic Id	Ingredient	Ave (lb/gal)
67630	ISOPROPYL ALCOHOL	0.01
67641	ACETONE	0.14
78933	METHYL ETHYL KETONE	0.12
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.10
108101	METHYL ISOBUTYL KETONE	0.26
108883	TOLUENE	0.20
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.01
1330207	XYLENE	0.59

Company name : PPG
Category : BASE COAT

Toxic Id	Ingredient	Ave (lb/gal)
67630	ISOPROPYL ALCOHOL	0.01
67641	ACETONE	0.20
78933	METHYL ETHYL KETONE	0.44
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.77
108101	METHYL ISOBUTYL KETONE	0.17
108883	TOLUENE	0.28
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.01
1330207	XYLENE	0.31
7439921	LEAD	0.08
18540299	CHROMIUM VI	0.02

Company Name: PPG

Category : SINGLE STAGE TOPCOAT

Toxic Id	Ingredient	Ave (lb/gal)
67641	ACETONE	0.03
78933	METHYL ETHYL KETONE	0.31
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.33
108101	METHYL ISOBUTYL KETONE	0.03
108883	TOLUENE	0.16
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.02
1330207	XYLENE	1.05
7439921	LEAD	0.21
18540299	CHROMIUM VI	0.06

Company name : PPG
Category : SPECIALTY COATING

Toxic Id	Ingredient	Ave (lb/gal)
67630	ISOPROPYL ALCOHOL	0.26
67641	ACETONE	0.35
78933	METHYL ETHYL KETONE	0.55
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.40
108101	METHYL ISOBUTYL KETONE	0.06
108883	TOLUENE	1.09
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.03
1330207	XYLENE	1.38
18540299	CHROMIUM VI	0.01

Category : CLEAR COAT

Toxic Id	Ingredient	Ave (lb/gal)
78933	METHYL ETHYL KETONE	0.27
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.28
108101	METHYL ISOBUTYL KETONE	0.09
108883	TOLUENE	0.21
1330207	XYLENE	1.05

Company name : PPG
Category : REDUCER BLENDS

Toxic Id	Ingredient	Ave (lb/gal)
67641	ACETONE	0.67
78933	METHYL ETHYL KETONE	0.78
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.77
108101	METHYL ISOBUTYL KETONE	0.08
108101	MIBK	0.08
108883	TOLUENE	0.74
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.18
1330207	XYLENE	0.16
1330207	XYLENES	0.16

Company name : PPG
Category : REDUCER BLENDS

Toxic Id	Ingredient	Ave (lb/gal)
108101	METHYL ISOBUTYL KETONE	0.08
108101	MIBK	0.08
108883	TOLUENE	0.74
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.18
1330207	XYLENE	0.16
1330207	XYLENES	0.16

Category : SPECIALTY ADDITIVES

Toxic Id	Ingredient	Ave (lb/gal)
67630	ISOPROPYL ALCOHOL	0.01
67641	ACETONE	0.01
78933	METHYL ETHYL KETONE	0.47
108883	TOLUENE	0.84
111762	ETHYLENE GLYCOL MONOBUTYL ETHER	0.01

Category : CLEANERS

Toxic Id	Ingredient	Ave (lb/gal)
67630	ISOPROPYL ALCOHOL	1.37
67641	ACETONE	0.44
107982	PROPYLENE GLYCOL MONOMETHYL ETHER	0.04
108883	TOLUENE	1.01
1330207	XYLENE	0.77

Manufacturer : BASF
Category : Basecoat

Toxic	Ingredient	Weighted Ave.
67561	Methanol	0.0000
67630	Isopropyl alcohol	.2598
67641	Acetone	.3051
78933	Methyl ethyl ketone {2-Butanone}	.0739
100414	Ethyl benzene	.1296
107982	Propylene glycol monomethyl ether	0.0000
108101	Methyl isobutyl ketone {Hexone}	.4452
108656	Propylene glycol monomethyl ether acetate	.4076
108883	Toluene	.9347
111762	Ethylene glycol monobutyl ether	0.0000
112072	2-butoxyethyl acetate	.1394
1330207	Xylene	.6795
7440020	Nickel	0.0000
7440508	Copper	.0028

Manufacturer : BASF
Category : Basecoat
No Lead or Chromium Formulation

Toxic Id	INGREDIENTS	Wt. Ave (lb.gal)
67641	ACETONE	0.4037
1328536	COPPER	0.0585
7440508	Copper (compound)	0.0028
100414	Ethyl Benzene	0.1247
112072	Ethylene Glycol Butyl Eth. Act	0.1326
67630	ISOPROPANOL	0.3050
108101	METHYL ISOBUTYL KETONE	0.3973
67561	Methanol	0.0002
78933	Methyl Ethyl Ketone	0.1557
108656	Propylene Glycol Methyl Eth Ac	0.4379
108883	Toluene	1.1010
1330207	XYLENE	0.6473

Manufacturer : BASF
Category : Basecoat
Chromium Formulation

Toxic Id	INGREDIENTS	Wt. Ave (lb.gal)
67641	ACETONE	0.2497
7440473	Chromium III	0.0005
100414	Ethyl Benzene	0.1120
112072	Ethylene Glycol Butyl Eth. Act	0.2342
111762	Ethylene Glycol Butyl Ether	0.1967
67630	ISOPROPANOL	0.3995
78933	Methyl Ethyl Ketone	0.0033
108656	Propylene Glycol Methyl Eth Ac	0.2392
108883	Toluene	0.7656
1330207	XYLENE	0.6200

Manufacturer : BASF
Category : Pretreatment

Toxic	Ingredient	Weighted Ave.
67561	Methanol	.0236
67630	Isopropyl alcohol	1.1911
100414	Ethyl benzene	.0549
108101	Methyl isobutyl ketone {Hexone}	.0050
108656	Propylene glycol monomethyl ether acetate	.1197
111762	Ethylene glycol monobutyl ether	.1104
112072	2-butoxyethyl acetate	.0276
1314132	Zinc oxide	.0561
1330207	Xylene	.2651

Manufacturer : BASF
Category : Primer/Sealer

Toxic	Ingredient	Weighted Ave.
67630	Isopropyl alcohol	.0046
78933	Methyl ethyl ketone {2-Butanone}	.0222
100414	Ethyl benzene	.0956
107982	Propylene glycol monomethyl ether	.0024
108101	Methyl isobutyl ketone {Hexone}	.0050
108656	Propylene glycol monomethyl ether acetate	.0437
108883	Toluene	.0897
112072	2-butoxyethyl acetate	.1050
1330207	Xylene	.4696
7440666	Zinc	.0042

Formulations without Lead or Chromium

Manufacturer : BASF
Category : Primer/Surfacer

APPENDIX E

Toxic	Ingredient	Weighted Ave.
67630	Isopropyl alcohol	.0883
67641	Acetone	.9549
78933	Methyl ethyl ketone {2-Butanone}	.0993
100414	Ethyl benzene	.0431
107982	Propylene glycol monomethyl ether	.0753
108101	Methyl isobutyl ketone {Hexone}	.0518
108656	Propylene glycol monomethyl ether acetate	.0812
108883	Toluene	.4431
111762	Ethylene glycol monobutyl ether	.0932
112072	2-butoxyethyl acetate	.0175
1330207	Xylene	.1751

Manufacturer : BASF
CATEGORY : Single Stage

Lead & Chromium Formulation

Toxic Id	INGREDIENTS	Wt. Ave (lb.gal)
67630	ISOPROPANOL	0.7064
67641	ACETONE	0.5900
78933	Methyl Ethyl Ketone	0.2563
100414	Ethyl Benzene	0.0700
108656	Propylene Glycol Methyl Eth Ac	0.0969
108883	Toluene	1.5757
112072	Ethylene Glycol Butyl Eth. Act	0.0504
1328536	COPPER	0.0100
1330207	XYLENE	0.2978
7429905	ALUMINUM	0.0338
7440666	Zinc (compound)	0.0003
12656858	LEAD CHROMATE/MOLYBDATE	0.0329

Manufacturer : BASF
CATEGORY : Single Stage

No Lead No Chromium Formulation

Toxic ID	INGREDIENTS	Wt. Ave (lb.gal)
100414	Ethyl Benzene	0.0322
108656	Propylene Glycol Methyl Eth Ac	0.0120
112072	Ethylene Glycol Butyl Eth. Act	0.0328
1328536	COPPER	0.0013
1330207	XYLENE	0.1541

Formulations without Lead or Chromium

Manufacturer : BASF
Category : Clearcoat

APPENDIX E

Toxic	Ingredient	Weighted Ave.
67630	Isopropyl alcohol	.8503
67641	Acetone	.5035
78933	Methyl ethyl ketone {2-Butanone}	.2751
100414	Ethyl benzene	.0583
108656	Propylene glycol monomethyl ether acetate	.4048
108883	Toluene	1.7550
112072	2-butoxyethyl acetate	.0814
1330207	Xylene	.2788

Appendix F - Bodyshop Survey Form

September 1, 1996

Owner/Operator:
company
address
city state zip

SUBJECT: Requirement to Provide Coating and Solvent Usage for 1995

Dear Owner/Operator:

We seek your assistance to help us estimate toxic emissions from coating operations at your bodyshop by completing the enclosed survey. In 1987, the California Legislature passed the Air Toxics "Hot Spots" Act (Health and Safety Code (H&SC) Sect. 44630 et seq.). This law created a statewide program to estimate toxic air emissions from businesses. The District must collect and process this data.

The information you provide will be used to generate a prioritization score. If that score exceeds a minimum value, we will complete a screening risk assessment to estimate potential health impacts due to the emissions from your business. If the risk exceeds the level of significance set by the District Board, you may be required to notify the affected community of these potential health impacts. You may also be required to develop a risk reduction plan to reduce the risk from your facility below the level of significance. A District representative will be available to assist you in all steps of this process.

The enclosed survey contains two pages. The first page requests general information about your facility and the type of booth and spray equipment used. The second page contains columns and rows where you enter information about the volumes of coatings and solvents you sprayed or otherwise employed. For easier reporting, the coatings and solvents are broken down into general categories. Note that Sections 42303 and 40701(g) of the H&SC authorize us to require you to promptly provide all of the information.

It is important that you work with the District to help us develop your emissions inventory and risk assessment. You may also provide your own emissions estimate and health risk assessment using more detailed information, if you choose. Please complete the enclosed survey and return it on or before October 1, 1996, to:

Your Local APCD
2588 Full Circle
Hillendale, CA 94666
Attn: Toxics Coordinator

If you have any questions about the program or completing the survey, please call the toxics coordinator at (932) 322-7237 during normal business hours. Thank you for your cooperation.

Respectfully,

I.M. Sorah, APCO
enclosures

INDUSTRY-WIDE TOXIC EMISSIONS INVENTORY SURVEY
AUTO BODYSHOP COATING OPERATIONS
EMISSION YEAR 1995

Dear Owner/Operator:

We request that you provide the following information, as authorized by H&SC section s 42303 or 40701(g). It will be used to estimate toxic emissions from your business and the potential health impact. Your full cooperation is appreciated by accurately completing this form. Return the form by October 1, 1996. If you have any questions, contact the toxics coordinator at (932) 322-7237.

FACILITY INFORMATION

Facility Name: ______________________________ Date: _________

Facility Address: ______________________________ City: ______________

ZIP: __________ Phone: ______________ Fac ID: ______ PTO : ______________

Contact: ______________________________ Title: ______________

Distance in feet to nearest: residence: ________ school/day care: ________ hospital: ________ property line: ________

EQUIPMENT INFORMATION

Indicate the types of spray guns used, and estimate the volume of coating sprayed for each type of gun. The total must equal 100%.

[] HVLP [] Conventional [] Other: __________ % used: _____

[] HVLP [] Conventional [] Other: __________ % used: _____

TOTAL: _____

Indicate locations where spraying is performed. The total for all locations used must equal 100%.

Spray Booth: [] yes [] no % used: ______
Prep Station: [] yes [] no % used: ______
Open Area: [] yes [] no % used: ______
TOTAL: ______

Building height: _____ ft width: _____ ft length: _____ ft Heated Booth: [] yes [] no Exhaust Temperature: ______ F°

Exhaust Stack: [] yes [] no Rain Cap: [] yes [] no Direction the Exhaust Stack Points: [] up [] sideways [] down

Exhaust Stack: Height Above Ground: _____ ft Diameter: ______ ft Other: ____x____ Blower Capacity: __________ cfm

Type of exhaust filter: [] None [] Water Curtain [] Paper [] Foam [] Fiberglass [] Other (specify): ______________

Filter/Removal Efficiency: _________ % **Attach manufacturer's information sheet verifying the removal or filter efficiency.**

Maximum gallons sprayed in any one hour: _______ gal/hr Average number of **hours** you actually spray each day: _____ hrs/day

Number of gallons you spray or use in an average week: **solvent:** ______________ **coating:** ______________

Average number of days per year that your shop paints cars: _______ days/year

---

COATING AND SOLVENT USAGE INFORMATION

Please complete the form on the back of this survey. Enter the brand of coatings and solvents used. If more than one brand is used, fill out a separate form for each brand. Report the number of gallons for ALL VOC containing materials used at your facility for the reporting year. You may reduce the amount used by the amount shipped offsite (waste) by estimating the % of each category disposed (1). **Attach copies of hazardous waste manifests** verifying the volume shipped (2). Volumes 1 and 2 should be the same. Be sure to include the weight percent of hexavalent chromium (chromates), if any, for each category. See MSDS or check with your distributor.

Brand or Manufacturer: Coatings: ______________________________ Solvents: ______________________________

Total gallons of all coatings used: ____________________(A) Total gallons of all solvents used: ____________________(B)

Category of Solvent or Coating	Chromate(*) Content (wt %)	Annual Usage (gal/yr)	Hazardous Waste (%)	Hazardous Waste (gal/yr)	Annual Usage Less Waste (gal/yr)
(EXAMPLE) PRIMER SEALER (**)	0.032	125	5	6	119
Pretreatment Wash Primer					
Solvent-based Precoat					
Waterborne Precoat					
Solvent-based Primer					
Waterborne Primer					
Solvent-based Primer Surfacer					
Waterborne-Primer Surfacer					
Primer Sealer					
Solid Color Topcoat					
Metallic/Iridescent Topcoat					
Specialty Coating					
Basecoat					
Groundcoat					
Midcoat					
Clearcoat					
Lacquer Primer					
Lacquer					
Lacquer Solvent, VOC = _______ lb/gal					
Surface Prep Solvent, VOC = _______ lb/gal					
Wax/Grease Remover, VOC = _______ lb/gal					
Thinners/Solvents, VOC = _______ lb/gal					
Gun Cleaning Solvent, VOC = _______ lb/gal					
Other: ___________, VOC = _______ lb/gal					
Other: ___________, VOC = _______ lb/gal					
Total Gallons (do not include EXAMPLE):	**District Use.**	gal(1)	--------------	gal(2)	--------------

(*) Carefully check material safety data sheets (MSDSs) or call your distributor for these values. If no chromates are found, enter 0.
(**) Example calculation: 125 gallons total x 5% = 125 x 5/100 = 6 gallons to hazardous waste or off-site recycle.
125 gallons total - 6 gallons waste/recycle = 119 gallons used

(1) **This sum should be (A) + (B) from the top of this page.**
(2) **This sum should equal the volume of material shipped as hazardous waste verified by your manifests.**

Appendix G - Fall Out Fraction

TO: AB Task Force
FROM: Chairman, ABTF
DATE: September 19, 1995
SUBJECT: Recommendations on Fall Out Fraction

After reviewing the Rohr Fallout Fraction Test Report, it is reasonable to include a fall out fraction (FOF) in lieu of a transfer efficiency for auto bodyshop operations that use spray booths. The Rohr FOF value averages 91% which includes a transfer efficiency of 75% using a Devilbiss HVLP gun. The booth stack flow rate was 21,185 ACFM with a cross-sectional flow rate within the fully-enclosed spray booth of greater than 100 ft/min. The booth was thoroughly cleaned prior to coating application. The spray gun was set at 5 psi, and the paint spray pattern limited to a width of 5 or 6 inches. The painter met the minimum requirements for industrial standards and was not a top of the line painter.

For spray operations outside of a booth, I do not believe that a FOF is appropriate. Although fall out does occur, the transfer efficiency should be the sole determining factor because of the additional wind effect which increases the probability of dispersing particulate material, not experienced in a spray booth. For a partially enclosed booth the transfer efficiency should also be used due to the uncertainty in determining the booth capture efficiency and the increased probability of wind dispersion, as mentioned before.

For the following reasons, I recommend that the FOF be set at a lower value than the Rohr number. Instead of 91%, I think an FOF closer to 80% for HVLP spray operations and 50% for air assisted operations should be suggested.

The amount of rebounding particulates is determined, in part, by the force of the coating application. In the Rohr study the HVLP gun was set at 5 psi. Few bodyshops are that careful and often exceed that value. As a result, more particulates are launched into the air and the transfer efflciency, a major contributor to the FOF, is lowered. I would guess that the resulting transfer efficiency is closer to 65%, less than the 75% found in the Rohr report.

The Rohr booth was thoroughly cleaned before use to remove any background particulates. Generally, a production or even small shop booth is swept with a shop broom and maybe lightly hosed down with water to keep the dust down. The average booth is not thoroughly cleaned. This results in increased particulate fugitives from previous coating operations. I would estimate this to reduce the FOF by about 2%.

The painting technique was far more controlled in the Rohr report than one would expect to find in a production shop and greater than that expected in an average bodyshop. The difference between the Rohr painter and one found in an average shop is probably not substantial but I would still suggest that the FOF is reduced by about 2% due to painter and painting technique differences. A Rohr painter is not paid based on the number of parts produced and a bodyshop painter may be under more pressure to get the job out.

The stack volumetric flow for an average bodyshop is about 10,000 to 15,000 ACFM. This is less than that used in the Rohr test and could result in an increase in the FOF due to more time being allowed in the average bodyshop for the particulate material to drop out. I would guess this to be about 1%.

Appendix H - Data Submittal to CARB

The California Air Resources Board has created data fields and formats for districts to use in submitting the autobody shop emission inventory data to the California Air Resources Board's Air Toxics Emissions Data System. It is expected that most districts will collect data via spreadsheets. Attached is a list of data fields to be included in the industrywide emission data submittals (Attachment I). The data fields have been kept to a minimum to avoid collecting unnecessary information. The inventory year, district, air basin, county code, SCC, PT units and SIC codes should be included in the heading of the spreadsheet. The rest of the data fields should be included in the body of the spreadsheet. For multi-county districts, the county code can be moved to the first column in the spreadsheet body. The Autobody Industrywide data formats can be standardized and also used for submitting other AB 2588 industrywide-type emissions data such as dry cleaning and gas station facilities. Attachment I also includes generic SIC/SCC codes that reflect the general operations of all the industrywide categories.

Attachment II is a mock-up of what the industrywide spreadsheet template should look like. CARB has developed a spreadsheet template for the districts' use in reporting these industrywide emissions and will provide a copy of the template to any district wanting to use it. The spreadsheet template can be provided in either Quattro Pro, Excell, or Lotus 1,2,3 format.

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Suggested Data Fields To Include In Industrywide Inventories

(To be included in the Heading of the Spreadsheet)

- Inventory Year
- District Code
- Air Basin Code
- County Code (include in spreadsheet body for multiple county districts)
- Facility SIC
- SCC (include in spreadsheet body if multiple processes)
- Process Units Code (include in spreadsheet body if multiple processes)

(To be included in the Body of the Spreadsheet)

- County Code (unless included in header)
- Facility ID
- Facility Name
- Facility Address, City, Zip Code
- SCC (unless included in header)
- Process Description (optional)
- Annual Process Rate
- Process Units Code (unless included in header)
- Max Hourly Process Rate
- Toxic ID
- Toxic Name
- Emission Factor
- Annual Emissions (pounds per year)
- Hourly Max Emissions (for substances with acute effects only, lb/hr)

Suggested "Generic" SCC Codes For Some E-I Facilities Most Likely To Be Covered By Industrywide Inventories

Facility Class	SIC Code	SCC Code	PT Code	Process Units
Gas Stations	5541	4-06-888-01	PT031	1000 Gals Throughput
Autobody Shops	7532	4-02-016-99	PT110	Tons of Solvent In Coating
Dry Cleaners	7216	4-01-001-98	PT109	Tons Solvent Consumed
Printing Shops	2759	4-05-888-01	PT105	Tons Product
Fiberglass Mfg.	2221,3229	3-05-012-99	PT117	Tons Processed
		3-08-007-99	PT105	Tons Product

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Attachment II

Inv. Year	**District**	**Air Basin**	**County**	**SIC**	**SCC**	**FPRU**						
1991	SC	SC	16	7532	40201699	PT110						
Fac. ID	**FName**	**FAddress**	**FCity**	**FZip**	**PRDesc**	**PR**	**MaxHrPR**	**Toxic**	**ToxName**	**Emfact**	**EMS**	**HrMaxEMS**
1023	Aaron A. Aardvark	122 Maple Lane	Anytown	91786	Car Paint	0.005	45	25321226	DiChloro Be	0.05	1200	634
1904	Otto's Auto Paint	12 Industrial Pkwy	City of Science	95819	Fume Hood	1.623	6	95501	1,2-DiCLBen	2.0001	232	623
												335

PRELIMINARY DATA
SUBJECT TO REVISION

Appendix I - Prioritization Procedures

The procedure recommended by the task force to prioritize auto body shops is based on the Emissions and Potency Procedure outlined in the Air Toxics "Hot Spots" Program Facility Prioritization Guidelines, prepared by the California Air Pollution Control Officers Association (CAPCOA), July 1990. These guidelines were developed by a committee comprised of representatives from Districts (including Ventura County), the California Air Resources Board (CARB), and the Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA).

The Emissions and Potency Procedure involves calculation of one or more numerical scores for a facility based on the following factors: emissions, potency or toxicity of compounds emitted, and receptor proximity. The procedure was designed to be straightforward and to be applied consistently to every facility. Moreover, it is designed to assure that high risk facilities are ranked high priority.

Using the prioritization procedure, facilities receive one or more numerical scores: potential carcinogenic effect, potential chronic non-carcinogenic effect, and potential acute non-carcinogenic effect. Facilities will then be prioritized based on the highest of the calculated scores.

For facilities that emit carcinogenic compounds, a facility score is calculated for carcinogenic effects according to the following equation:

$$TS = (\Sigma E_c P_c)(RP)1.7x10^3$$

Where:

TS = total facility score (carcinogenic effects)
c = specific carcinogenic substance
E_c = emissions of compound c, lbs/yr
P_c = unit risk factor for compound c
RP = receptor proximity adjustment factor (Table I-I)
$1.7x10^3$ = normalization factor

For facilities that emit compounds which have non-cancer health effects, facility scores are calculated for chronic and acute non-cancer effects according to the following equation:

$$TS^* = (\Sigma E_t/P_t)(RP)(NF)$$

Where:

TS^* = total facility score (chronic or acute non-carcinogenic effects)
t = specific toxic substance
E_t = emissions of compound t, lbs/hr (average or maximum)
P_t = acceptable exposure level of t, $\mu g/m^3$
RP = receptor proximity adjustment factor (Table I-I)
NF = normalization factor
NF = 150 for chronic exposure
NF = 1500 for acute exposure

Table I-I
Receptor Proximity Adjustment Factors

Receptor Proximity (R, meters)	RP (dimensionless)
$0<R<100$	1
$100<R<250$	0.25
$250<R<500$	0.04
$500<R<1000$	0.011
$1000<R<1500$	0.003
$1500<R<2000$	0.002
$R>2000$	0.001

The receptor proximity factor is based on the distance from the facility to the nearest receptor. A receptor may be a residence, school, day care center, hospital, or workplace; or an area zoned for these uses. The receptor proximity is determined by adding the distance from the facility property line to the nearest receptor or potential receptor and the distance from the facility's nearest emitting source to the facility property line.

Where adequate information on the receptor proximity is not available, a receptor proximity factor of 1 can be used as a screening assumption. In any case, this default value will likely be correct for most facilities, as the majority of auto bodyshops are located less than 100 meters from the nearest receptor. However, for facilities initially categorized as high priority using default receptor proximity data, actual receptor proximity data should be obtained for a refined priority score calculation before proceeding with a scoping level health risk assessment.

The unit risk factors and acceptable exposure levels to be used are contained in Appendix C as derived from the current version of the CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines. Values labeled as "screening", "preliminary", or "proposed", or which OEHHA otherwise indicates are not recommended for use in prioritization, may be used at the discretion of an individual District.

The task force recommends that facilities with scores less than or equal to one be categorized as low priority, and facilities with scores greater than or equal to 10 be categorized as high priority. All other facilities will be placed in the intermediate priority category. The basis for the recommended thresholds is included in the CAPCOA Air Toxics "Hot Spots" Program Facility Prioritization Guidelines.

Note that this procedure was developed using a minimum distance of 50 meters from the source to the nearest receptor, and may not be applicable for auto bodyshops with source to receptor distances of less than 50 meters.

Appendix J - Dispersion Model Inputs and Results

```
                    ISCST2 - (DATED 93109)

                    IBM-PC VERSION (2.1  ) ISCST2X
                    (C) COPYRIGHT 1992, TRINITY CONSULTANTS, INC.
                    SERIAL NUMBER 10592 SOLD TO SAN DIEGO AIR POLLUTION

Run Began on  5/24/1995 at 17:12:40


*** TRINITY SOURCE FILE NAME: C:\MODELS\DATA\AUTOBOL2.PNT
*** TRINITY DOWNWASH FILE NAME: C:\MODELS\DATA\AUTOBOL2.WAK
*** TRINITY RECEPTOR FILE NAME: C:\MODELS\DATA\AUTOBOD.REC
CO STARTING
CO TITLEONE Autobody Shop Run 1
CO TITLETWO Lindbergh (Coastal) Meteorology
CO MODELOPT DFAULT CONC RURAL
CO AVERTIME 1 MONTH PERIOD
CO POLLUTID POLL1
CO TERRHGTS FLAT
CO ELEVUNIT METERS
CO RUNORNOT RUN
CO FINISHED
SO STARTING
SO LOCATION B12530 POINT      0.00       0.00       0.00
SO SRCPARAM B12530 1.000000      7.62     294.26     9.1440      0.762
SO LOCATION B12575 POINT      0.00       0.00       0.00
SO SRCPARAM B12575 1.000000      7.62     294.26     22.8600     0.610
SO LOCATION B13030 POINT      0.00       0.00       0.00
SO SRCPARAM B13030 1.000000      9.14     294.26     9.1440      0.762
SO LOCATION B13075 POINT      0.00       0.00       0.00
SO SRCPARAM B13075 1.000000      9.14     294.26     22.8600     0.610
SO LOCATION B125D POINT      0.00       0.00       0.00
SO SRCPARAM B125D 1.000000      7.62     294.26     0.0000      1.524
SO LOCATION B130D POINT      0.00       0.00       0.00
SO SRCPARAM B130D 1.000000      9.14     294.26     0.0000      1.524
SO LOCATION B225D POINT      0.00       0.00       0.00
SO SRCPARAM B225D 1.000000      7.62     294.26     0.0000      1.524
SO LOCATION B230D POINT      0.00       0.00       0.00
SO SRCPARAM B230D 1.000000      9.14     294.26     0.0000      1.524
SO LOCATION B325D POINT      0.00       0.00       0.00
SO SRCPARAM B325D 1.000000      7.62     294.26     0.0000      1.524
SO LOCATION B330D POINT      0.00       0.00       0.00
SO SRCPARAM B330D 1.000000      9.14     294.26     0.0000      1.524
SO LOCATION B425D POINT      0.00       0.00       0.00
SO SRCPARAM B425D 1.000000      7.62     294.26     0.0000      1.524
SO LOCATION B430D POINT      0.00       0.00       0.00
SO SRCPARAM B430D 1.000000      9.14     294.26     0.0000      1.524
SO LOCATION FUG1 VOLUME      0.00       0.00       0.00
SO SRCPARAM FUG1 0.500000      0.76       1.42       0.71
SO LOCATION FUG2 VOLUME      0.00       0.00       0.00
SO SRCPARAM FUG2 0.500000      0.76       1.42       0.71
SO BUILDHGT B12530      6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12530      6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12530      6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12530      6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12530      6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12530      6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDWID B12530      8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12530      8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12530      8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12530      8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12530      8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12530      8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDHGT B13030      6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B13030      6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B13030      6.10      6.10      6.10      6.10      6.10      6.10
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SO BUILDHGT B13030     6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B13030     6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B13030     6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDWID B13030     8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B13030     8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B13030     8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B13030     8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B13030     8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B13030     8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDHGT B125D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B125D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B125D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B125D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B125D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B125D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDWID B125D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B125D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B125D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B125D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B125D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B125D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDHGT B130D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B130D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B130D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B130D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B130D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B130D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDWID B130D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B130D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B130D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B130D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B130D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDWID B130D    8.53     8.53     8.53     8.53     8.53     8.53
SO BUILDHGT B225D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B225D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B225D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B225D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B225D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B225D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDWID B225D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B225D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B225D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B225D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B225D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B225D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDHGT B230D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B230D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B230D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B230D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B230D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B230D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDWID B230D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B230D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B230D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B230D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B230D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDWID B230D   23.77    23.77    23.77    23.77    23.77    23.77
SO BUILDHGT B325D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B325D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B325D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B325D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B325D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT B325D    6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDWID B325D   38.10    38.10    38.10    38.10    38.10    38.10
SO BUILDWID B325D   38.10    38.10    38.10    38.10    38.10    38.10
SO BUILDWID B325D   38.10    38.10    38.10    38.10    38.10    38.10
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SO BUILDWID B325D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDWID B325D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDWID B325D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDHGT B330D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B330D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B330D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B330D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B330D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B330D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDWID B330D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDWID B330D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDWID B330D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDWID B330D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDWID B330D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDWID B330D    38.10     38.10     38.10     38.10     38.10     38.10
SO BUILDHGT B425D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B425D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B425D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B425D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B425D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B425D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDWID B425D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B425D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B425D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B425D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B425D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B425D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDHGT B430D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B430D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B430D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B430D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B430D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B430D     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDWID B430D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B430D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B430D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B430D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B430D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDWID B430D    54.86     54.86     54.86     54.86     54.86     54.86
SO BUILDHGT B12575     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12575     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12575     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12575     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12575     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B12575     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDWID B12575     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12575     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12575     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12575     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12575     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B12575     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDHGT B13075     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B13075     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B13075     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B13075     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B13075     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDHGT B13075     6.10      6.10      6.10      6.10      6.10      6.10
SO BUILDWID B13075     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B13075     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B13075     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B13075     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B13075     8.53      8.53      8.53      8.53      8.53      8.53
SO BUILDWID B13075     8.53      8.53      8.53      8.53      8.53      8.53
SO EMISUNIT 1000000.000000 GRAMS/SEC MICROGRAMS/M**3
SO SRCGROUP B_12530 B12530
SO SRCGROUP B_12575 B12575
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SO SRCGROUP B_13030 B13030
SO SRCGROUP B_13075 B13075
SO SRCGROUP B_125D B125D
SO SRCGROUP B_130D B130D
SO SRCGROUP B_225D B225D
SO SRCGROUP B_230D B230D
SO SRCGROUP B_325D B325D
SO SRCGROUP B_330D B330D
SO SRCGROUP B_425D B425D
SO SRCGROUP B_430D B430D
SO SRCGROUP FUG FUG1 FUG2
SO FINISHED
RE STARTING
RE GRIDPOLR AUTO     STA
RE GRIDPOLR AUTO     ORIG 0.00 0.00
RE GRIDPOLR AUTO     DIST 10.00 25.00 50.00 75.00
RE GRIDPOLR AUTO     DIST 100.00 125.00 150.00 175.00
RE GRIDPOLR AUTO     DIST 200.00 250.00 300.00 350.00
RE GRIDPOLR AUTO     DIST 400.00 450.00 500.00 600.00
RE GRIDPOLR AUTO     DIST 750.00 1000.00
RE GRIDPOLR AUTO     GDIR 36 0.00 10.00
RE GRIDPOLR AUTO     END
RE FINISHED
ME STARTING
ME INPUTFIL C:\MODELS\MET\SANMYF88.BIN UNFORM
ME ANEMHGHT   10.000 METERS
ME SURFDATA 23188 1988 LINDBERGH
ME UAIRDATA 3131 1988 MONTGOMERY
ME STARTEND 1988 1 1 1 1988 12 31 24
ME FINISHED
OU STARTING
OU RECTABLE 1 FIRST
OU RECTABLE MONTH FIRST
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
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*** ISCST2 - VERSION 93109 ***     *** Autobody Shop Run 1                                               ***        05/24/95
                                   *** Lindbergh (Coastal) Meteorology                                   ***        17:12:43
                                                                                                                    PAGE   1
*** MODELING OPTIONS USED:  CONC   RURAL  FLAT        DFAULT

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
           1. Final Plume Rise.
           2. Stack-tip Downwash.
           3. Buoyancy-induced Dispersion.
           4. Use Calms Processing Routine.
           5. Not Use Missing Data Processing Routine.
           6. Default Wind Profile Exponents.
           7. Default Vertical Potential Temperature Gradients.
           8. "Upper Bound" Values for Supersquat Buildings.
           9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  2 Short Term Average(s) of:   1-HR  MONTH
    and Calculates PERIOD Averages

**This Run Includes:   14 Source(s);     13 Source Group(s); and    648 Receptor(s)

**The Model Assumes A Pollutant Type of:  POLL1

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of PERIOD Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.00 ;    Decay Coef. =   0.0000     ;    Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Input Runstream File: C:\MODELS\DATA\AUTOBOL2.DAT            ;  **Output Print File: C:\MODELS\DATA\AUTOBOL2.LST
```

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
B12530	0	0.10000E+01	0.0	0.0	0.0	7.62	294.26	9.14	0.76	YES	
B12575	0	0.10000E+01	0.0	0.0	0.0	7.62	294.26	22.86	0.61	YES	
B13030	0	0.10000E+01	0.0	0.0	0.0	9.14	294.26	9.14	0.76	YES	
B13075	0	0.10000E+01	0.0	0.0	0.0	9.14	294.26	22.86	0.61	YES	
B125D	0	0.10000E+01	0.0	0.0	0.0	7.62	294.26	0.00	1.52	YES	
B130D	0	0.10000E+01	0.0	0.0	0.0	9.14	294.26	0.00	1.52	YES	
B225D	0	0.10000E+01	0.0	0.0	0.0	7.62	294.26	0.00	1.52	YES	
B230D	0	0.10000E+01	0.0	0.0	0.0	9.14	294.26	0.00	1.52	YES	
B325D	0	0.10000E+01	0.0	0.0	0.0	7.62	294.26	0.00	1.52	YES	
B330D	0	0.10000E+01	0.0	0.0	0.0	9.14	294.26	0.00	1.52	YES	
B425D	0	0.10000E+01	0.0	0.0	0.0	7.62	294.26	0.00	1.52	YES	
B430D	0	0.10000E+01	0.0	0.0	0.0	9.14	294.26	0.00	1.52	YES	

*** MODELING OPTIONS USED: CONC   RURAL FLAT   DFAULT

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
FUG1	0	0.50000E+00	0.0	0.0	0.0	0.76	1.42	0.71	
FUG2	0	0.50000E+00	0.0	0.0	0.0	0.76	1.42	0.71	

*** MODELING OPTIONS USED: CONC   RURAL FLAT   DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
B_12530	B12530 ,
B_12575	B12575 ,
B_13030	B13030 ,
B_13075	B13075 ,
B_125D	B125D ,
B_130D	B130D ,
B_225D	B225D ,
B_230D	B230D ,
B_325D	B325D ,
B_330D	B330D ,
B_425D	B425D ,
B_430D	B430D ,
FUG	FUG1 , FUG2 ,

*** ISCST2 - VERSION 93109 ***   *** Autobody Shop Run 1   ***   05/24/95
*** Lindbergh (Coastal) Meteorology   ***   17:12:43
PAGE 5

*** MODELING OPTIONS USED: CONC   RURAL FLAT   DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: B12530

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	8.5,	0	2	6.1,	8.5,	0	3	6.1,	8.5,	0	4	6.1,	8.5,	0	5	6.1,	8.5,	0	6	6.1,	8.5,	0
7	6.1,	8.5,	0	8	6.1,	8.5,	0	9	6.1,	8.5,	0	10	6.1,	8.5,	0	11	6.1,	8.5,	0	12	6.1,	8.5,	0
13	6.1,	8.5,	0	14	6.1,	8.5,	0	15	6.1,	8.5,	0	16	6.1,	8.5,	0	17	6.1,	8.5,	0	18	6.1,	8.5,	0
19	6.1,	8.5,	0	20	6.1,	8.5,	0	21	6.1,	8.5,	0	22	6.1,	8.5,	0	23	6.1,	8.5,	0	24	6.1,	8.5,	0
25	6.1,	8.5,	0	26	6.1,	8.5,	0	27	6.1,	8.5,	0	28	6.1,	8.5,	0	29	6.1,	8.5,	0	30	6.1,	8.5,	0
31	6.1,	8.5,	0	32	6.1,	8.5,	0	33	6.1,	8.5,	0	34	6.1,	8.5,	0	35	6.1,	8.5,	0	36	6.1,	8.5,	0

SOURCE ID: B12575

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	8.5,	0	2	6.1,	8.5,	0	3	6.1,	8.5,	0	4	6.1,	8.5,	0	5	6.1,	8.5,	0	6	6.1,	8.5,	0
7	6.1,	8.5,	0	8	6.1,	8.5,	0	9	6.1,	8.5,	0	10	6.1,	8.5,	0	11	6.1,	8.5,	0	12	6.1,	8.5,	0
13	6.1,	8.5,	0	14	6.1,	8.5,	0	15	6.1,	8.5,	0	16	6.1,	8.5,	0	17	6.1,	8.5,	0	18	6.1,	8.5,	0
19	6.1,	8.5,	0	20	6.1,	8.5,	0	21	6.1,	8.5,	0	22	6.1,	8.5,	0	23	6.1,	8.5,	0	24	6.1,	8.5,	0
25	6.1,	8.5,	0	26	6.1,	8.5,	0	27	6.1,	8.5,	0	28	6.1,	8.5,	0	29	6.1,	8.5,	0	30	6.1,	8.5,	0
31	6.1,	8.5,	0	32	6.1,	8.5,	0	33	6.1,	8.5,	0	34	6.1,	8.5,	0	35	6.1,	8.5,	0	36	6.1,	8.5,	0

SOURCE ID: B13030

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	8.5,	0	2	6.1,	8.5,	0	3	6.1,	8.5,	0	4	6.1,	8.5,	0	5	6.1,	8.5,	0	6	6.1,	8.5,	0
7	6.1,	8.5,	0	8	6.1,	8.5,	0	9	6.1,	8.5,	0	10	6.1,	8.5,	0	11	6.1,	8.5,	0	12	6.1,	8.5,	0
13	6.1,	8.5,	0	14	6.1,	8.5,	0	15	6.1,	8.5,	0	16	6.1,	8.5,	0	17	6.1,	8.5,	0	18	6.1,	8.5,	0
19	6.1,	8.5,	0	20	6.1,	8.5,	0	21	6.1,	8.5,	0	22	6.1,	8.5,	0	23	6.1,	8.5,	0	24	6.1,	8.5,	0
25	6.1,	8.5,	0	26	6.1,	8.5,	0	27	6.1,	8.5,	0	28	6.1,	8.5,	0	29	6.1,	8.5,	0	30	6.1,	8.5,	0
31	6.1,	8.5,	0	32	6.1,	8.5,	0	33	6.1,	8.5,	0	34	6.1,	8.5,	0	35	6.1,	8.5,	0	36	6.1,	8.5,	0

SOURCE ID: B13075

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	8.5,	0	2	6.1,	8.5,	0	3	6.1,	8.5,	0	4	6.1,	8.5,	0	5	6.1,	8.5,	0	6	6.1,	8.5,	0
7	6.1,	8.5,	0	8	6.1,	8.5,	0	9	6.1,	8.5,	0	10	6.1,	8.5,	0	11	6.1,	8.5,	0	12	6.1,	8.5,	0
13	6.1,	8.5,	0	14	6.1,	8.5,	0	15	6.1,	8.5,	0	16	6.1,	8.5,	0	17	6.1,	8.5,	0	18	6.1,	8.5,	0
19	6.1,	8.5,	0	20	6.1,	8.5,	0	21	6.1,	8.5,	0	22	6.1,	8.5,	0	23	6.1,	8.5,	0	24	6.1,	8.5,	0
25	6.1,	8.5,	0	26	6.1,	8.5,	0	27	6.1,	8.5,	0	28	6.1,	8.5,	0	29	6.1,	8.5,	0	30	6.1,	8.5,	0
31	6.1,	8.5,	0	32	6.1,	8.5,	0	33	6.1,	8.5,	0	34	6.1,	8.5,	0	35	6.1,	8.5,	0	36	6.1,	8.5,	0

*** ISCST2 - VERSION 93109 ***   *** Autobody Shop Run 1   ***   05/24/95
*** Lindbergh (Coastal) Meteorology   ***   17:12:43
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*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: B125D

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	8.5,	0	2	6.1,	8.5,	0	3	6.1,	8.5,	0	4	6.1,	8.5,	0	5	6.1,	8.5,	0	6	6.1,	8.5,	0
7	6.1,	8.5,	0	8	6.1,	8.5,	0	9	6.1,	8.5,	0	10	6.1,	8.5,	0	11	6.1,	8.5,	0	12	6.1,	8.5,	0
13	6.1,	8.5,	0	14	6.1,	8.5,	0	15	6.1,	8.5,	0	16	6.1,	8.5,	0	17	6.1,	8.5,	0	18	6.1,	8.5,	0
19	6.1,	8.5,	0	20	6.1,	8.5,	0	21	6.1,	8.5,	0	22	6.1,	8.5,	0	23	6.1,	8.5,	0	24	6.1,	8.5,	0
25	6.1,	8.5,	0	26	6.1,	8.5,	0	27	6.1,	8.5,	0	28	6.1,	8.5,	0	29	6.1,	8.5,	0	30	6.1,	8.5,	0
31	6.1,	8.5,	0	32	6.1,	8.5,	0	33	6.1,	8.5,	0	34	6.1,	8.5,	0	35	6.1,	8.5,	0	36	6.1,	8.5,	0

SOURCE ID: B130D

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	8.5,	0	2	6.1,	8.5,	0	3	6.1,	8.5,	0	4	6.1,	8.5,	0	5	6.1,	8.5,	0	6	6.1,	8.5,	0
7	6.1,	8.5,	0	8	6.1,	8.5,	0	9	6.1,	8.5,	0	10	6.1,	8.5,	0	11	6.1,	8.5,	0	12	6.1,	8.5,	0
13	6.1,	8.5,	0	14	6.1,	8.5,	0	15	6.1,	8.5,	0	16	6.1,	8.5,	0	17	6.1,	8.5,	0	18	6.1,	8.5,	0
19	6.1,	8.5,	0	20	6.1,	8.5,	0	21	6.1,	8.5,	0	22	6.1,	8.5,	0	23	6.1,	8.5,	0	24	6.1,	8.5,	0
25	6.1,	8.5,	0	26	6.1,	8.5,	0	27	6.1,	8.5,	0	28	6.1,	8.5,	0	29	6.1,	8.5,	0	30	6.1,	8.5,	0
31	6.1,	8.5,	0	32	6.1,	8.5,	0	33	6.1,	8.5,	0	34	6.1,	8.5,	0	35	6.1,	8.5,	0	36	6.1,	8.5,	0

SOURCE ID: B225D

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	23.8,	0	2	6.1,	23.8,	0	3	6.1,	23.8,	0	4	6.1,	23.8,	0	5	6.1,	23.8,	0	6	6.1,	23.8,	0
7	6.1,	23.8,	0	8	6.1,	23.8,	0	9	6.1,	23.8,	0	10	6.1,	23.8,	0	11	6.1,	23.8,	0	12	6.1,	23.8,	0
13	6.1,	23.8,	0	14	6.1,	23.8,	0	15	6.1,	23.8,	0	16	6.1,	23.8,	0	17	6.1,	23.8,	0	18	6.1,	23.8,	0
19	6.1,	23.8,	0	20	6.1,	23.8,	0	21	6.1,	23.8,	0	22	6.1,	23.8,	0	23	6.1,	23.8,	0	24	6.1,	23.8,	0
25	6.1,	23.8,	0	26	6.1,	23.8,	0	27	6.1,	23.8,	0	28	6.1,	23.8,	0	29	6.1,	23.8,	0	30	6.1,	23.8,	0
31	6.1,	23.8,	0	32	6.1,	23.8,	0	33	6.1,	23.8,	0	34	6.1,	23.8,	0	35	6.1,	23.8,	0	36	6.1,	23.8,	0

SOURCE ID: B230D

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	23.8,	0	2	6.1,	23.8,	0	3	6.1,	23.8,	0	4	6.1,	23.8,	0	5	6.1,	23.8,	0	6	6.1,	23.8,	0
7	6.1,	23.8,	0	8	6.1,	23.8,	0	9	6.1,	23.8,	0	10	6.1,	23.8,	0	11	6.1,	23.8,	0	12	6.1,	23.8,	0
13	6.1,	23.8,	0	14	6.1,	23.8,	0	15	6.1,	23.8,	0	16	6.1,	23.8,	0	17	6.1,	23.8,	0	18	6.1,	23.8,	0
19	6.1,	23.8,	0	20	6.1,	23.8,	0	21	6.1,	23.8,	0	22	6.1,	23.8,	0	23	6.1,	23.8,	0	24	6.1,	23.8,	0
25	6.1,	23.8,	0	26	6.1,	23.8,	0	27	6.1,	23.8,	0	28	6.1,	23.8,	0	29	6.1,	23.8,	0	30	6.1,	23.8,	0
31	6.1,	23.8,	0	32	6.1,	23.8,	0	33	6.1,	23.8,	0	34	6.1,	23.8,	0	35	6.1,	23.8,	0	36	6.1,	23.8,	0

*** ISCST2 - VERSION 93109 ***   *** Autobody Shop Run 1
*** Lindbergh (Coastal) Meteorology   ***   05/24/95
***   17:12:43

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT   PAGE 7

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: B325D

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	38.1,	0	2	6.1,	38.1,	0	3	6.1,	38.1,	0	4	6.1,	38.1,	0	5	6.1,	38.1,	0	6	6.1,	38.1,	0
7	6.1,	38.1,	0	8	6.1,	38.1,	0	9	6.1,	38.1,	0	10	6.1,	38.1,	0	11	6.1,	38.1,	0	12	6.1,	38.1,	0
13	6.1,	38.1,	0	14	6.1,	38.1,	0	15	6.1,	38.1,	0	16	6.1,	38.1,	0	17	6.1,	38.1,	0	18	6.1,	38.1,	0
19	6.1,	38.1,	0	20	6.1,	38.1,	0	21	6.1,	38.1,	0	22	6.1,	38.1,	0	23	6.1,	38.1,	0	24	6.1,	38.1,	0
25	6.1,	38.1,	0	26	6.1,	38.1,	0	27	6.1,	38.1,	0	28	6.1,	38.1,	0	29	6.1,	38.1,	0	30	6.1,	38.1,	0
31	6.1,	38.1,	0	32	6.1,	38.1,	0	33	6.1,	38.1,	0	34	6.1,	38.1,	0	35	6.1,	38.1,	0	36	6.1,	38.1,	0

SOURCE ID: B330D

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	38.1,	0	2	6.1,	38.1,	0	3	6.1,	38.1,	0	4	6.1,	38.1,	0	5	6.1,	38.1,	0	6	6.1,	38.1,	0
7	6.1,	38.1,	0	8	6.1,	38.1,	0	9	6.1,	38.1,	0	10	6.1,	38.1,	0	11	6.1,	38.1,	0	12	6.1,	38.1,	0
13	6.1,	38.1,	0	14	6.1,	38.1,	0	15	6.1,	38.1,	0	16	6.1,	38.1,	0	17	6.1,	38.1,	0	18	6.1,	38.1,	0
19	6.1,	38.1,	0	20	6.1,	38.1,	0	21	6.1,	38.1,	0	22	6.1,	38.1,	0	23	6.1,	38.1,	0	24	6.1,	38.1,	0
25	6.1,	38.1,	0	26	6.1,	38.1,	0	27	6.1,	38.1,	0	28	6.1,	38.1,	0	29	6.1,	38.1,	0	30	6.1,	38.1,	0
31	6.1,	38.1,	0	32	6.1,	38.1,	0	33	6.1,	38.1,	0	34	6.1,	38.1,	0	35	6.1,	38.1,	0	36	6.1,	38.1,	0

SOURCE ID: B425D

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	54.9,	0	2	6.1,	54.9,	0	3	6.1,	54.9,	0	4	6.1,	54.9,	0	5	6.1,	54.9,	0	6	6.1,	54.9,	0
7	6.1,	54.9,	0	8	6.1,	54.9,	0	9	6.1,	54.9,	0	10	6.1,	54.9,	0	11	6.1,	54.9,	0	12	6.1,	54.9,	0
13	6.1,	54.9,	0	14	6.1,	54.9,	0	15	6.1,	54.9,	0	16	6.1,	54.9,	0	17	6.1,	54.9,	0	18	6.1,	54.9,	0
19	6.1,	54.9,	0	20	6.1,	54.9,	0	21	6.1,	54.9,	0	22	6.1,	54.9,	0	23	6.1,	54.9,	0	24	6.1,	54.9,	0
25	6.1,	54.9,	0	26	6.1,	54.9,	0	27	6.1,	54.9,	0	28	6.1,	54.9,	0	29	6.1,	54.9,	0	30	6.1,	54.9,	0
31	6.1,	54.9,	0	32	6.1,	54.9,	0	33	6.1,	54.9,	0	34	6.1,	54.9,	0	35	6.1,	54.9,	0	36	6.1,	54.9,	0

SOURCE ID: B430D

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	6.1,	54.9,	0	2	6.1,	54.9,	0	3	6.1,	54.9,	0	4	6.1,	54.9,	0	5	6.1,	54.9,	0	6	6.1,	54.9,	0
7	6.1,	54.9,	0	8	6.1,	54.9,	0	9	6.1,	54.9,	0	10	6.1,	54.9,	0	11	6.1,	54.9,	0	12	6.1,	54.9,	0
13	6.1,	54.9,	0	14	6.1,	54.9,	0	15	6.1,	54.9,	0	16	6.1,	54.9,	0	17	6.1,	54.9,	0	18	6.1,	54.9,	0
19	6.1,	54.9,	0	20	6.1,	54.9,	0	21	6.1,	54.9,	0	22	6.1,	54.9,	0	23	6.1,	54.9,	0	24	6.1,	54.9,	0
25	6.1,	54.9,	0	26	6.1,	54.9,	0	27	6.1,	54.9,	0	28	6.1,	54.9,	0	29	6.1,	54.9,	0	30	6.1,	54.9,	0
31	6.1,	54.9,	0	32	6.1,	54.9,	0	33	6.1,	54.9,	0	34	6.1,	54.9,	0	35	6.1,	54.9,	0	36	6.1,	54.9,	0

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: AUTO ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

10.0,	25.0,	50.0,	75.0,	100.0,	125.0,	150.0,	175.0,	200.0,	250.0,
300.0,	350.0,	400.0,	450.0,	500.0,	600.0,	750.0,	1000.0,		

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

360.0,	10.0,	20.0,	30.0,	40.0,	50.0,	60.0,	70.0,	80.0,	90.0,
100.0,	110.0,	120.0,	130.0,	140.0,	150.0,	160.0,	170.0,	180.0,	190.0,
200.0,	210.0,	220.0,	230.0,	240.0,	250.0,	260.0,	270.0,	280.0,	290.0,
300.0,	310.0,	320.0,	330.0,	340.0,	350.0,				

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

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1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
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METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 88 1 1 1
AND END DATE: 88 12 31 24

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

Maximum X/Q Values (ug/m3 per g/s) at Selected Distances for Various Source Types and Meteorological Regimes

Table J-1
Max X/Q at or beyond specified distances for the Annual Avg Period

Scenario Number	Source Description	Max X/Q at 10 m or beyond				Max X/Q at 25 m or beyond				Max X/Q at 50 m or beyond			
		San Diego		SCREEN2		San Diego		SCREEN2		San Diego		SCREEN2	
		Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban
1	25-ft stack, 30 fps velocity	51	36	69	77	51	36	69	77	51	36	69	63
2	25-ft stack, 75 fps velocity	15	11	22	36	15	11	22	36	15	11	22	31
3	30-ft stack, 30 fps velocity	28	26	26	55	28	26	26	55	28	26	26	53
4	30-ft stack, 75 fps velocity	11	8	12	26	11	8	12	26	11	8	12	26
5	25-ft stack with obstruction to vertical flow	235	455	1015	423	235	455	1002	410	190	367	842	330
6	30-ft stack with obstruction to vertical flow	96	177	450	205	96	177	450	205	96	177	450	195
7	Fugitive release outside of a building	7667	13101	10808	5964	2450	5433	6932	2228	877	2283	3829	813

Table J-2
Max X/Q at or beyond specified distances for the Monthly Avg Period

Scenario Number	Source Description	Max X/Q at 10 m or beyond				Max X/Q at 25 m or beyond				Max X/Q at 50 m or beyond			
		San Diego		SCREEN2		San Diego		SCREEN2		San Diego		SCREEN2	
		Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban
1	25-ft stack, 30 fps velocity	88	59	260	289	88	59	260	289	88	59	260	237
2	25-ft stack, 75 fps velocity	24	18	82	137	24	18	82	137	24	18	82	118
3	30-ft stack, 30 fps velocity	47	43	98	205	47	43	98	205	47	43	98	198
4	30-ft stack, 75 fps velocity	18	14	46	99	18	14	46	99	18	14	46	99
5	25-ft stack with obstruction to vertical flow	364	1014	3807	1585	364	1014	3759	1538	364	1014	3159	1239
6	30-ft stack with obstruction to vertical flow	149	395	1688	769	149	395	1688	769	149	395	1688	730
7	Fugitive release outside of a building	11614	27658	40530	22365	3776	11624	25995	8355	3776	11624	14358	3048

Table J-3
Max X/Q at or beyond specified distances for the Hourly Avg Period

Scenario Number	Source Description	Max X/Q at 10 m or beyond				Max X/Q at 25 m or beyond				Max X/Q at 50 m or beyond			
		San Diego		SCREEN2		San Diego		SCREEN2		San Diego		SCREEN2	
		Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban	Coastal	Inland	Rural	Urban
1	25-ft stack, 30 fps velocity	758	797	868	964	758	797	868	964	758	797	868	790
2	25-ft stack, 75 fps velocity	278	279	274	456	278	279	274	456	278	279	274	394
3	30-ft stack, 30 fps velocity	414	369	326	682	414	369	326	682	414	369	326	659
4	30-ft stack, 75 fps velocity	148	151	153	328	148	151	153	328	148	151	153	328
5	25-ft stack with obstruction to vertical flow	11635	12552	12690	5283	11635	12552	12530	5127	9691	10533	10530	4131
6	30-ft stack with obstruction to vertical flow	4659	5065	5627	2562	4659	5065	5627	2562	4659	5065	5627	2433
7	Fugitive release outside of a building	134352	134977	135100	74550	134352	86607	86650	27850	46277	47846	47860	10160

Relative Dispersion Factors For Use in Scoping Risk Assessments for Autobody Shops

Meteorological Setting (1): **Generic with Rural Setting**

Table J-4

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Annual Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters) (2)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.0002	35	54	67	63	60	57	53	50	44	39	35	32	30	27	23	25	23
2	"	25	75	2.0	0.005	16	20	22	21	19	18	15	14	13	12	12	11	10	11	12	13	13
3	"	30	30	2.5	0.00001	6	25	25	24	25	26	25	25	24	25	24	23	21	21	20	20	20
4	"	30	75	2.0	0.001	2	6	12	12	11	11	11	11	9	9	8	8	8	9	11	11	11
5	"	25	0	2.0	NA	1002	842	636	494	404	342	296	260	209	172	146	125	112	99	79	61	42
6	"	30	0	2.0	NA	228	403	395	331	287	255	229	208	175	150	130	114	101	92	75	58	41
7	Fugitive	h=2.5	sx=1.4	sy=0.7	10808	6932	3829	2433	1693	1252	967	773	640	457	345	271	220	182	154	115	81	52

Table J-5

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Monthly Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters) (2)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.001	133	202	251	237	225	212	199	187	165	147	133	120	111	102	88	94	87
2	"	25	75	2.0	0.02	59	76	82	77	73	67	56	52	47	47	45	41	38	42	47	47	48
3	"	30	30	2.5	0.00004	21	95	94	91	92	96	95	93	92	92	90	85	80	77	76	77	76
4	"	30	75	2.0	0.004	6	22	44	45	42	42	41	40	35	32	31	30	30	34	39	42	40
5	"	25	0	2.0	NA	3759	3159	2384	1851	1516	1283	1111	977	782	647	547	470	418	370	298	228	158
6	"	30	0	2.0	NA	854	1511	1482	1240	1077	956	860	781	657	563	489	429	380	343	281	217	154
7	Fugitive	h=2.5	sx=1.4	sy=0.7	40530	25995	14358	9123	6348	4695	3627	2898	2399	1715	1295	1018	824	683	577	430	304	195

Table J-6

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Hourly Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters) (2)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.002	443	673	836	791	749	707	665	624	548	491	444	400	370	342	292	314	290
2	"	25	75	2.0	0.06	197	252	274	258	243	222	188	175	157	156	148	138	128	141	155	158	159
3	"	30	30	2.5	0.0001	71	316	312	302	307	320	316	310	305	308	299	283	266	257	254	256	252
4	"	30	75	2.0	0.01	20	73	147	149	140	141	138	133	116	108	102	101	100	114	131	139	133
5	"	25	0	2.0	0.0E+00	12530	10530	7948	6170	5053	4277	3702	3256	2607	2155	1822	1567	1394	1234	992	762	527
6	"	30	0	2.0	0.0E+00	2846	5038	4940	4132	3590	3186	2867	2604	2190	1877	1630	1430	1267	1144	937	722	512
7	Fugitive	h=2.5	sx=1.4	sy=0.7	135100	86650	47860	30410	21160	15650	12090	9660	7995	5715	4316	3392	2747	2277	1923	1432	1013	650

1. Tables are available for San Diego coastal and inland settings and generic meteorology (using the SCREEN2 model) for both rural and urban settings.
2. Annual and monthly values were extrapolated from hourly values using factors of 0.08 and 0.3, respectively.

Relative Dispersion Factors For Use in Scoping Risk Assessments for Autobody Shops

Meteorological Setting (1) Generic with Urban Setting

Table J-7

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Annual Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters) (2)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.00003	77	63	49	41	36	37	38	37	32	27	22	19	16	14	11	8	5
2	"	25	75	2.0	0.006	36	31	25	20	16	15	18	20	21	19	17	15	14	12	10	7	5
3	"	30	30	2.5	0.00002	51	53	41	35	27	30	32	32	29	25	21	18	16	13	10	8	5
4	"	30	75	2.0	0.001	24	26	21	18	14	12	15	17	18	18	16	14	13	11	9	7	5
5	"	25	0	2.0	NA	410	330	249	183	137	106	84	69	48	36	28	23	19	16	12	8	5
6	"	30	0	2.0	NA	175	195	179	155	125	100	82	67	48	36	28	23	19	16	12	8	5
7	Fugitive	h=2.5	sx=1.4	sy=0.7	5964	2228	813	420	258	176	128	98	78	53	38	29	23	19	16	12	8	5

Table J-8

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Monthly Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters) (2)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.0001	289	237	185	154	135	140	144	139	120	101	84	71	60	52	40	29	19
2	"	25	75	2.0	0.02	136	118	92	76	62	57	69	76	78	72	65	57	51	45	36	27	18
3	"	30	30	2.5	0.00007	191	198	153	130	101	112	121	121	109	94	80	68	58	51	39	28	19
4	"	30	75	2.0	0.005	90	99	77	67	54	46	56	64	69	66	60	54	48	43	35	26	18
5	"	25	0	2.0	NA	1538	1239	934	685	514	398	317	258	181	135	105	85	70	59	44	31	20
6	"	30	0	2.0	NA	656	730	671	581	469	377	306	253	180	135	105	85	70	59	44	31	20
7	Fugitive	h=2.5	sx=1.4	sy=0.7	22365	8355	3048	1576	968	659	480	367	291	197	144	110	88	72	61	45	31	20

Table J-9

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Hourly Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters) (2)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.0003	964	790	618	512	451	468	480	464	401	335	280	236	202	174	134	97	63
2	"	25	75	2.0	0.07	454	394	308	252	206	191	231	253	259	241	216	191	169	150	120	89	60
3	"	30	30	2.5	0.0002	638	659	511	434	338	373	403	403	364	312	265	226	194	169	131	95	63
4	"	30	75	2.0	0.02	301	328	257	222	180	154	186	213	230	220	201	180	161	144	116	87	59
5	"	25	0	2.0	0.0E+00	5127	4131	3114	2283	1714	1326	1055	860	604	450	350	282	233	196	146	103	66
6	"	30	0	2.0	0.0E+00	2185	2433	2237	1935	1563	1256	1020	842	600	450	351	283	234	197	147	103	66
7	Fugitive	h=2.5	sx=1.4	sy=0.7	74550	27850	10160	5252	3228	2197	1601	1223	969	658	480	368	294	241	202	150	104	67

1. Tables are available for San Diego coastal and inland settings and generic meteorology (using the SCREEN2 model) for both rural and urban settings.
2. Annual and monthly values were extrapolated from hourly values using factors of 0.08 and 0.3, respectively.

Relative Dispersion Factors For Use in Scoping Risk Assessments for Autobody Shops

Meteorological Setting (1): San Diego Coastal Setting

Table J-10

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Annual Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	NA	22	40	51	49	44	39	34	29	23	19	16	13	11	10	8	6	4
2	"	25	75	2.0	NA	0.3	3	9	13	14	15	15	14	13	11	10	9	8	7	6	5	3
3	"	30	30	2.5	NA	0.8	10	22	27	28	27	25	23	19	16	13	12	10	9	7	5	4
4	"	30	75	2.0	NA	0.004	0.7	4	7	9	10	11	11	10	9	8	8	7	6	5	4	3
5	"	25	0	2.0	NA	235	190	142	107	84	68	56	47	35	27	22	18	15	13	10	7	5
6	"	30	0	2.0	NA	54	93	96	81	68	58	49	43	33	26	21	18	15	13	10	7	5
7	Fugitive	h=2.5	sx=1.4	sy=0.7	7667	2450	877	456	282	193	141	108	85	58	42	32	25	21	17	12	8	5

Table J-11

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Monthly Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	NA	35	68	88	85	78	69	61	54	42	34	28	24	20	18	14	10	6
2	"	25	75	2.0	0.0002	2	5	14	21	24	24	24	23	21	19	17	15	13	12	10	8	5
3	"	30	30	2.5	NA	1	17	37	46	47	46	44	40	34	28	24	21	18	16	12	9	6
4	"	30	75	2.0	0.00002	0	1	7	13	16	17	18	18	17	16	14	13	12	11	9	7	5
5	"	25	0	2.0	NA	364	294	220	165	129	104	86	72	54	42	33	27	23	20	15	10	7
6	"	30	0	2.0	NA	83	143	149	127	107	90	76	66	50	40	32	27	22	19	15	10	7
7	Fugitive	h=2.5	sx=1.4	sy=0.7	11614	3776	1321	679	418	285	207	159	128	88	65	50	40	33	27	20	14	8

Table J-12

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Hourly Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters) (2)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	NA	580	758	745	665	607	559	514	478	480	462	434	402	370	339	293	242	187
2	"	25	75	2.0	0.02	189	258	278	258	269	258	241	212	164	153	144	133	124	122	128	124	131
3	"	30	30	2.5	NA	53	305	320	401	414	393	361	327	337	335	311	284	258	243	225	190	153
4	"	30	75	2.0	0.006	15	88	147	148	144	144	139	134	122	127	125	117	112	108	109	110	111
5	"	25	0	2.0	NA	11635	9691	7280	5630	4596	3879	3350	2940	2345	1933	1630	1398	1241	1096	878	671	461
6	"	30	0	2.0	NA	2668	4659	4539	3779	3272	2895	2598	2354	1973	1684	1459	1277	1128	1017	830	636	448
7	Fugitive	h=2.5	sx=1.4	sy=0.7	134352	85197	46277	29047	20020	15778	13537	11870	10581	8713	7423	6476	5751	5177	4711	4000	3271	2522

1. Tables are available for San Diego coastal and inland settings and generic meteorology (using the SCREEN2 model) for both rural and urban settings.
2. The ISCST model did not perform calculations in turbulent building wake areas.

Relative Dispersion Factors For Use in Scoping Risk Assessments for Autobody Shops

Meteorological Setting (1) **San Diego Inland Setting**

Table J-13

Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Annual Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.00001	5	25	36	36	33	30	26	23	19	16	13	11	10	9	7	5	5
2	"	25	75	2.0	0.002	0.05	2	6	9	10	11	11	10	9	8	8	7	6	6	5	4	3
3	"	30	30	2.5	NA	0.7	12	23	26	26	24	22	20	17	14	12	10	9	8	6	5	4
4	"	30	75	2.0	0.0009	0.004	0.7	3	6	7	8	8	8	8	7	7	6	6	5	4	3	3
5	"	25	0	2.0	NA	455	367	271	206	166	138	118	102	80	65	54	46	40	35	28	21	14
6	"	30	0	2.0	NA	104	177	171	141	121	105	93	83	68	57	49	42	37	33	26	20	14
7	Fugitive	h=2.5	sx=1.4	sy=0.7	13101	5433	2283	1277	822	576	428	331	267	183	135	103	82	67	56	41	28	17

Table J-14

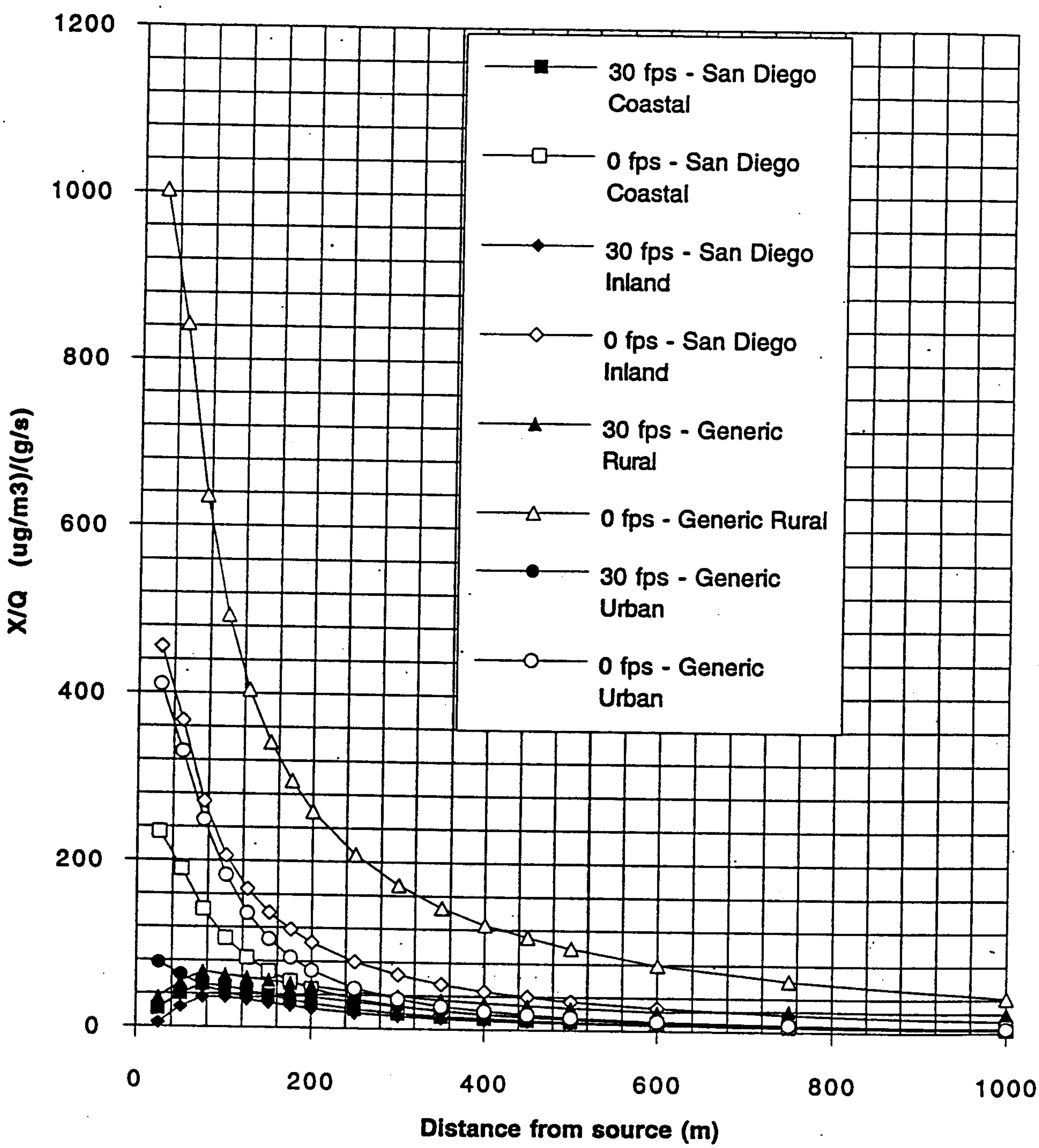
Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Monthly Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.00004	10	45	59	56	50	44	38	34	28	23	20	27	15	14	12	9	7
2	"	25	75	2.0	0.007	0.4	4	12	17	18	18	17	16	14	12	11	10	9	8	7	6	5
3	"	30	30	2.5	NA	2	25	41	43	41	37	33	30	24	21	18	16	14	12	11	9	9
4	"	30	75	2.0	0.002	0.02	2	7	11	13	14	14	13	12	11	10	9	8	8	7	6	6
5	"	25	0	2.0	NA	1014	820	607	463	372	310	264	229	179	145	121	102	90	78	62	46	31
6	"	30	0	2.0	NA	232	395	384	318	272	238	210	188	154	129	109	94	82	73	59	44	30
7	Fugitive	h=2.5	sx=1.4	sy=0.7	27658	11624	4935	2774	1793	1260	938	727	587	404	297	228	182	148	124	90	62	39

Table J-15

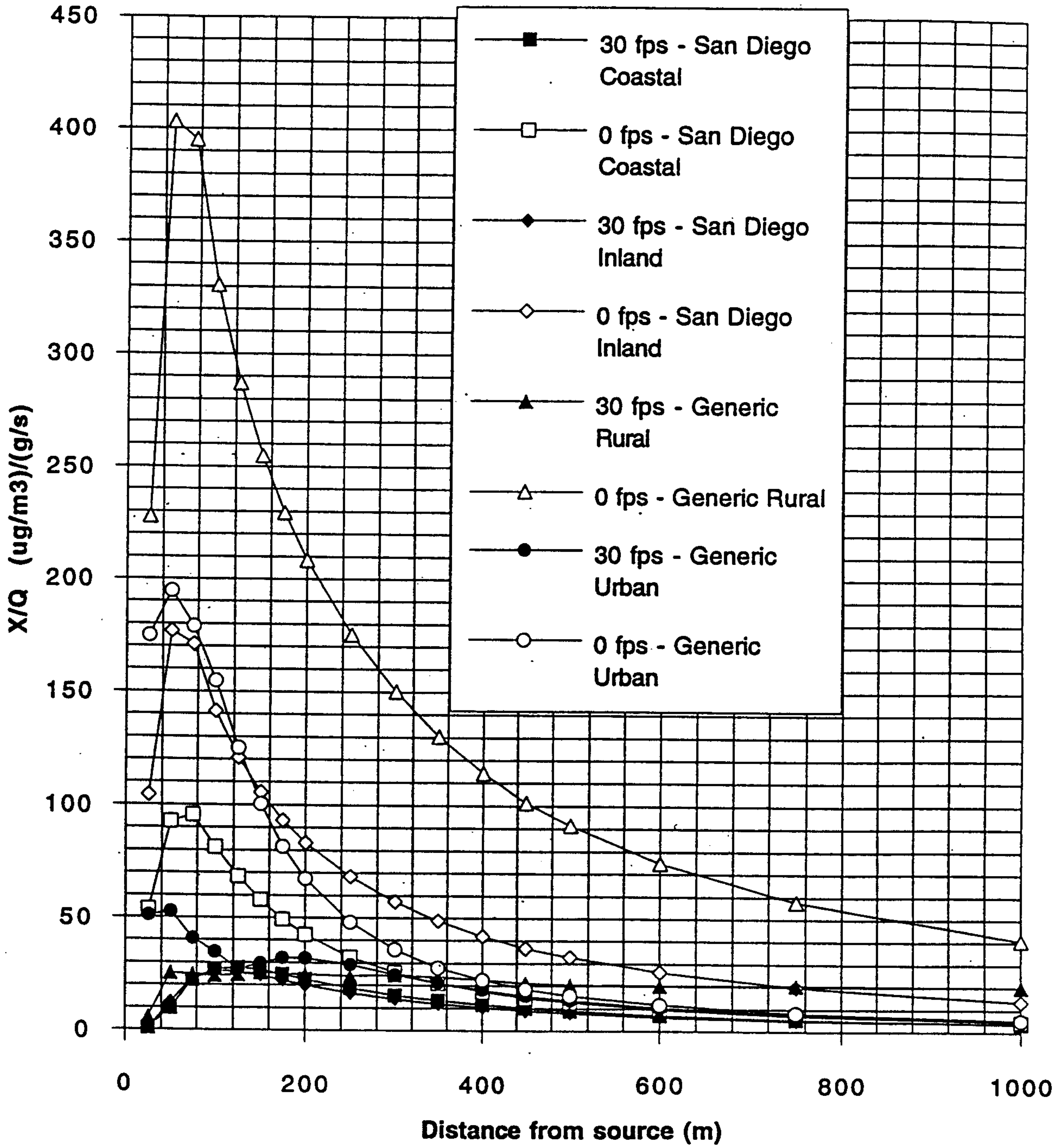
Scenario Number	Source Type	Stack Heigh (feet)	Exit Velocity (f/s)	Exit Diam. (feet)	Maximum Hourly Average X/Q Values (ug/m3)/(g/s) as a Function of Receptor Distance (meters) (2)																	
					10	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	750	1000
1	Stack	25	30	2.5	0.003	558	709	797	667	577	509	449	406	409	384	353	352	342	327	292	314	290
2	"	25	75	2.0	0.1	182	237	279	261	239	228	227	219	182	161	151	138	129	142	157	159	160
3	"	30	30	2.5	0.0002	51	308	312	303	311	320	314	317	369	368	344	314	308	295	263	256	252
4	"	30	75	2.0	0.03	10	108	151	148	142	143	137	131	121	124	124	119	117	120	133	140	135
5	"	25	0	2.0	NA	12552	10533	7951	6171	5054	4277	3701	3255	2606	2154	1821	1566	1393	1233	992	761	526
6	"	30	0	2.0	NA	2878	5065	4958	4143	3598	3192	2871	2607	2192	1878	1630	1431	1267	1144	937	722	512
7	Fugitive	h=2.5	sx=1.4	sy=0.7	134977	86607	47846	32341	25761	21470	18442	16187	14441	11909	10156	8869	7882	7101	6466	5495	4501	3477

1. Tables are available for San Diego coastal and inland settings and generic meteorology (using the SCREEN2 model) for both rural and urban settings.
2. The ISCST model did not perform calculations in turbulent building wake areas.

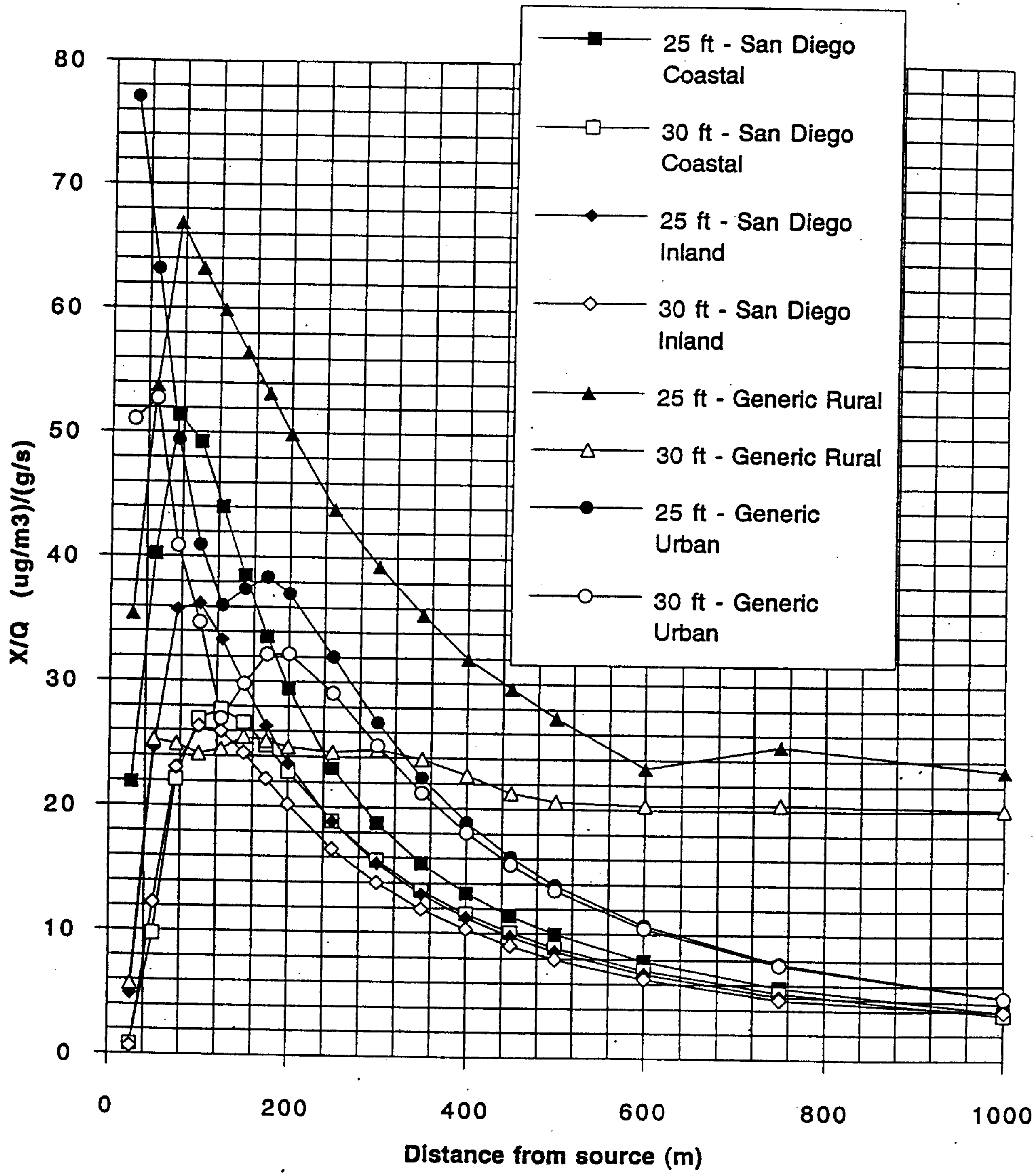
Effect of removing obstruction to vertical flow - 25 ft stack - Annual calculation



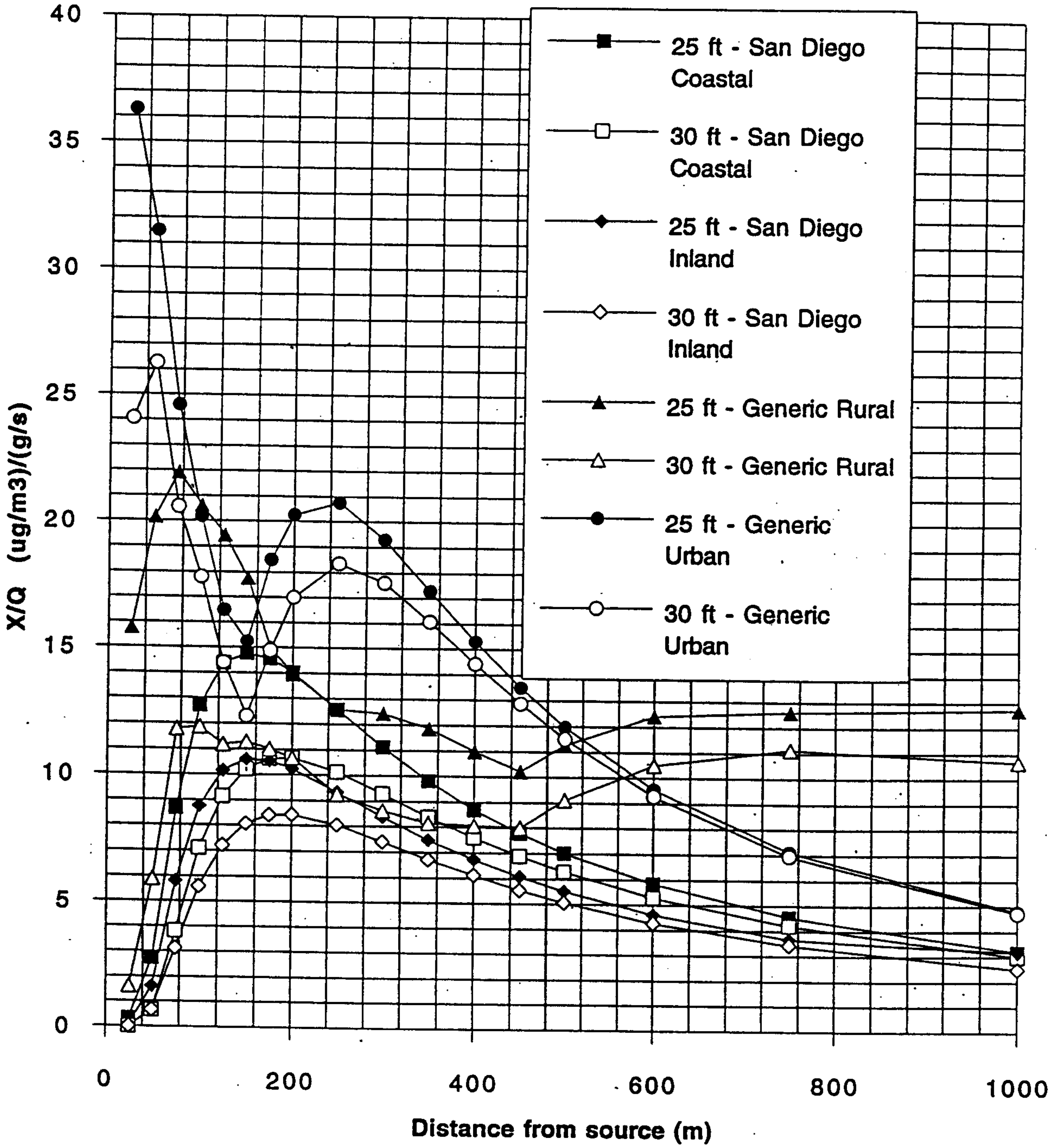
Effect of removing obstruction to vertical flow - 30 ft stack - Annual calculation



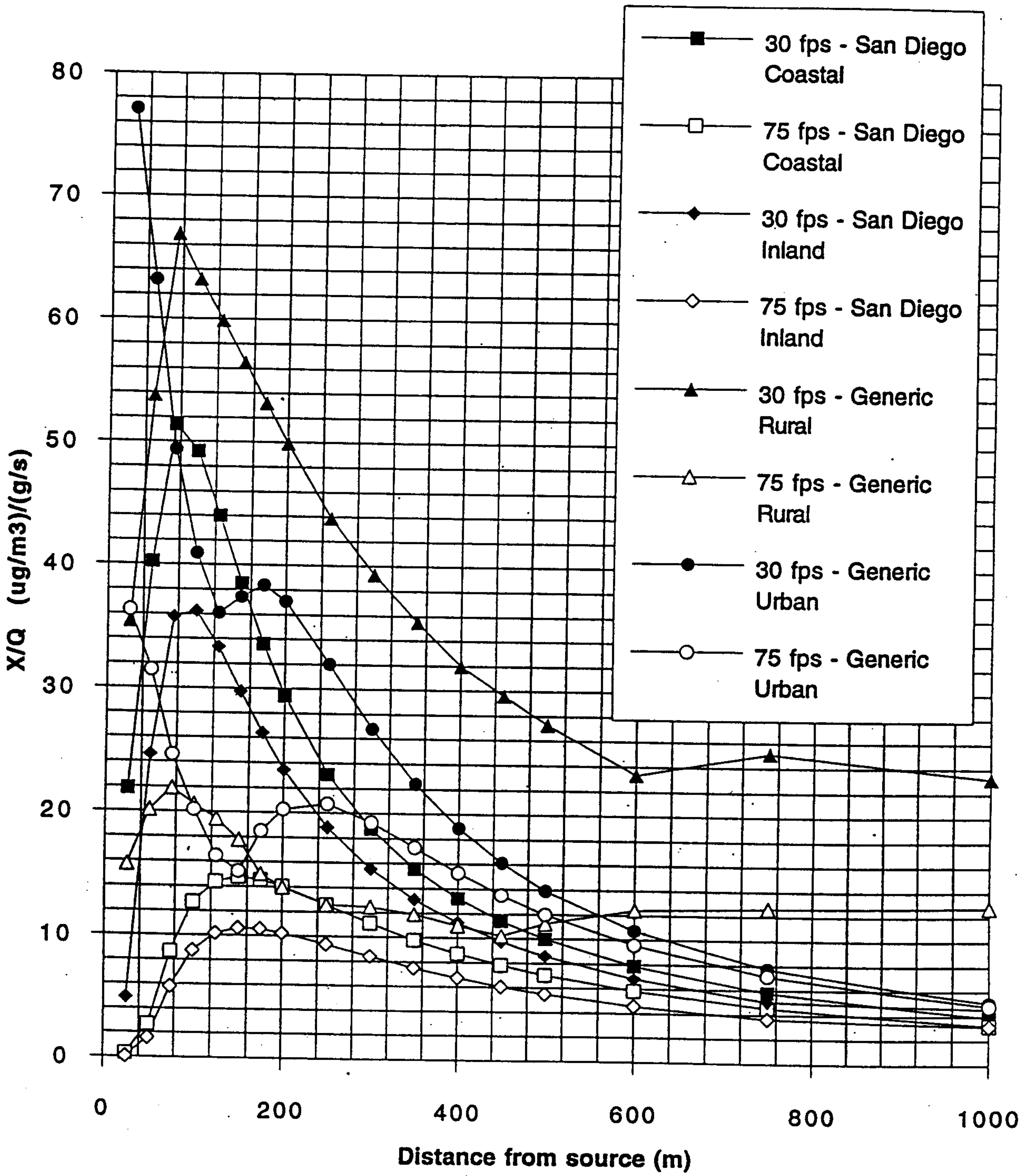
Effect of increasing stack height from 25 ft to 30 ft - exit velocity 30 fps - Annual calculation



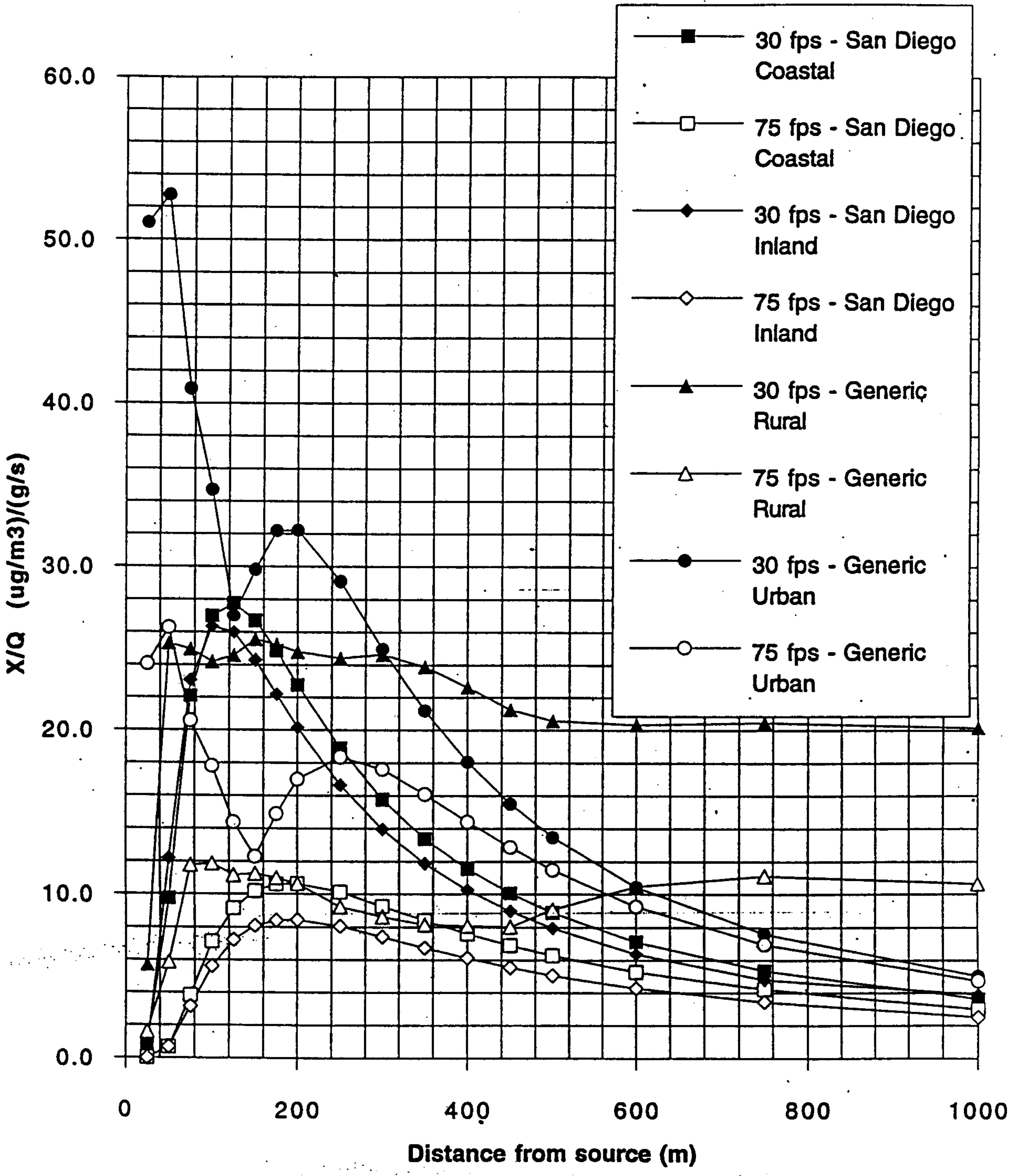
Effect of increasing stack height from 25 ft to 30 ft - exit velocity 75 fps - Annual calculation



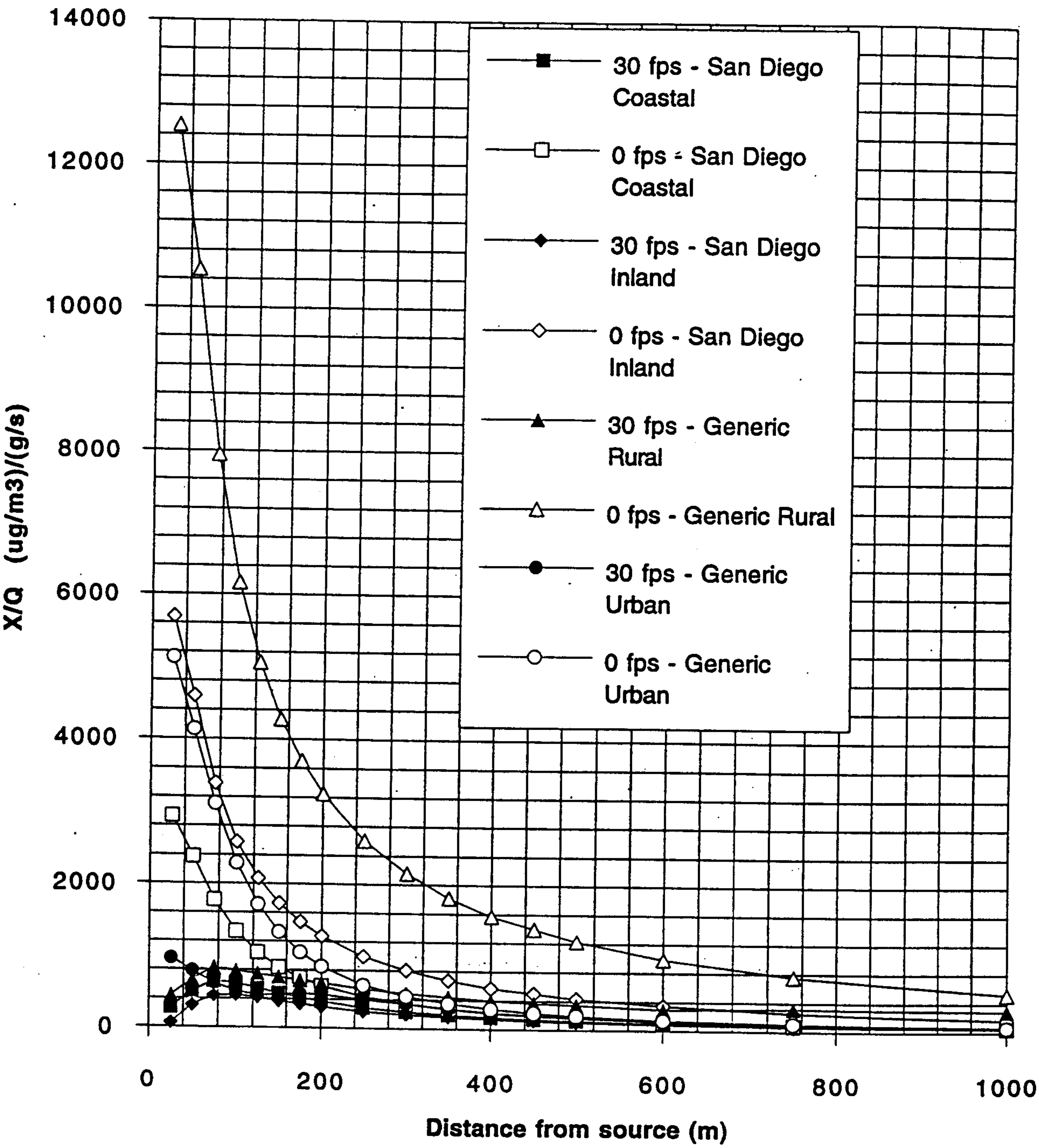
Effect of increasing exit velocity from 30 fps to 75 fps - 25 ft stack - Annual calculation



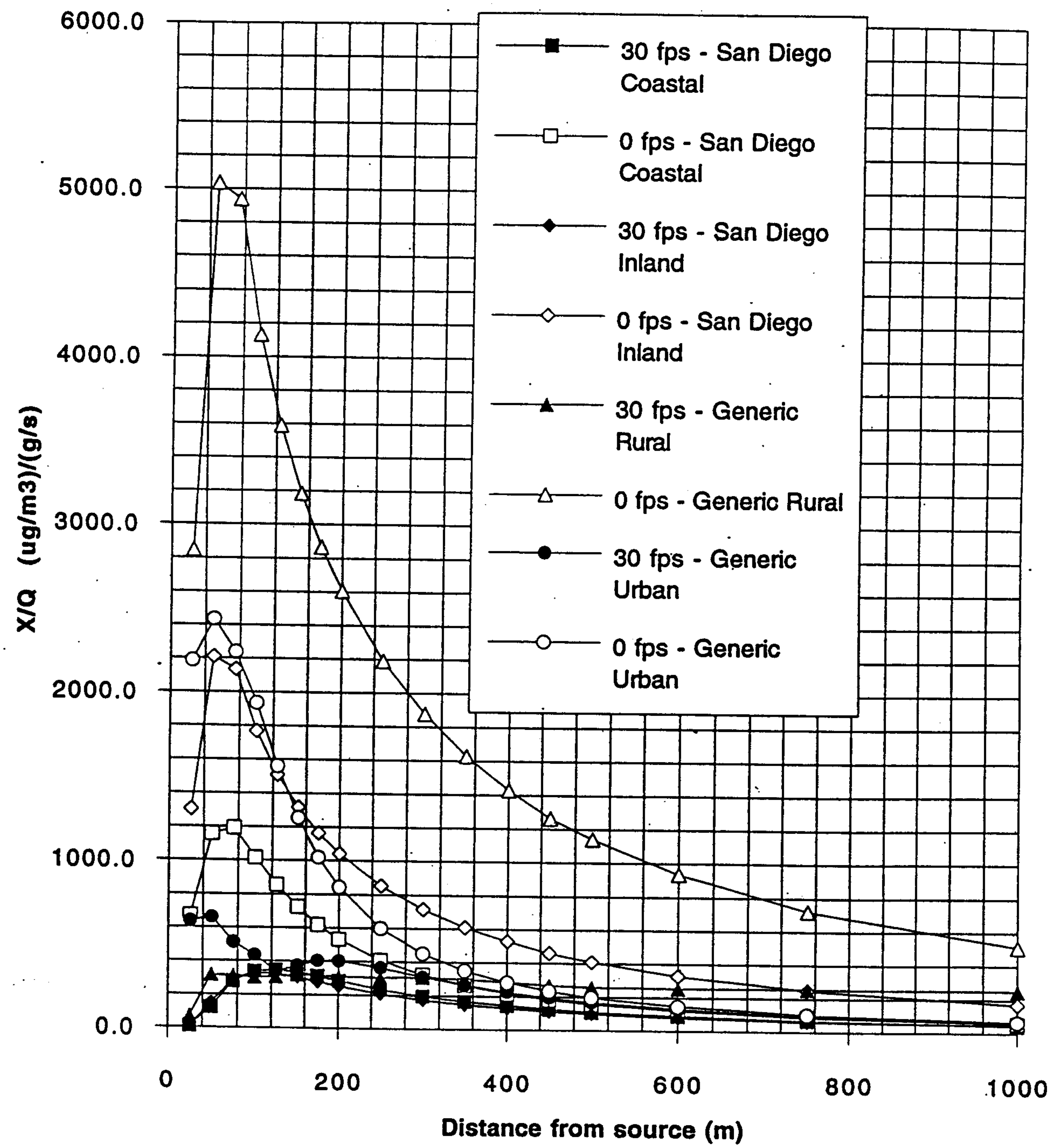
Effect of increasing exit velocity from 30 fps to 75 fps - 30 ft stack - Annual calculation



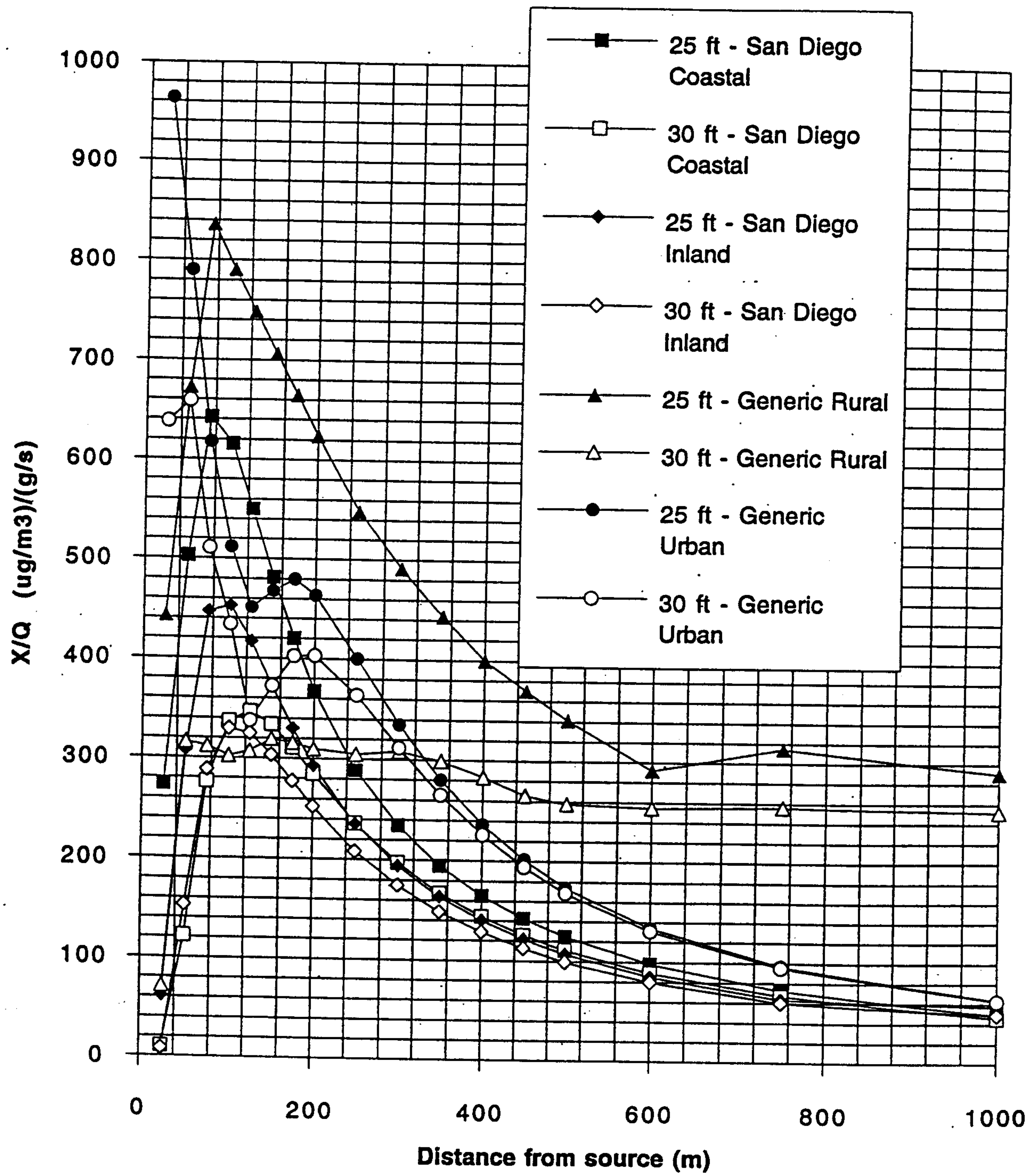
Effect of removing obstruction to vertical flow - 25 ft stack - Hourly calculation



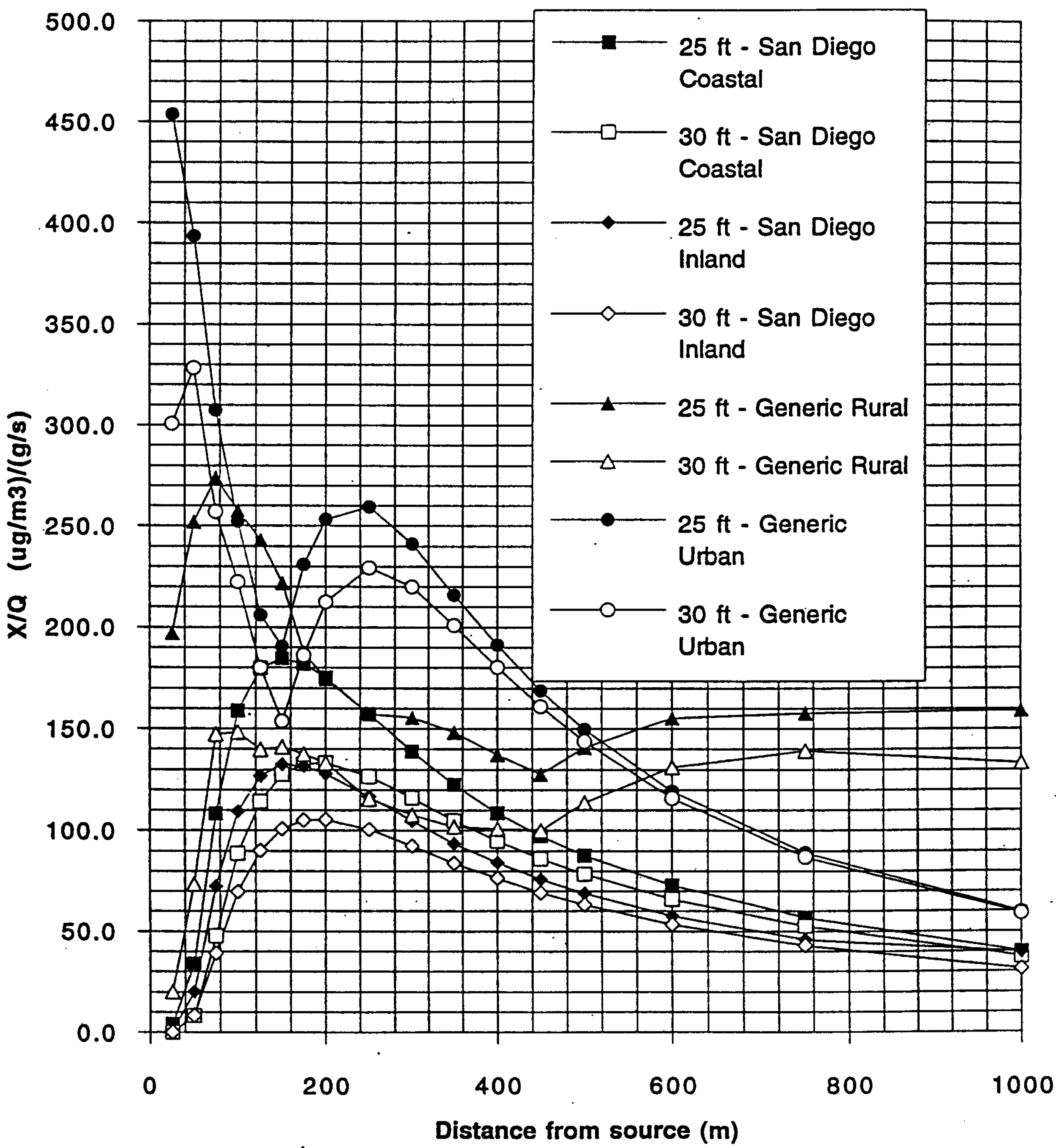
Effect of removing obstruction to vertical flow - 30 ft stack - Hourly calculation



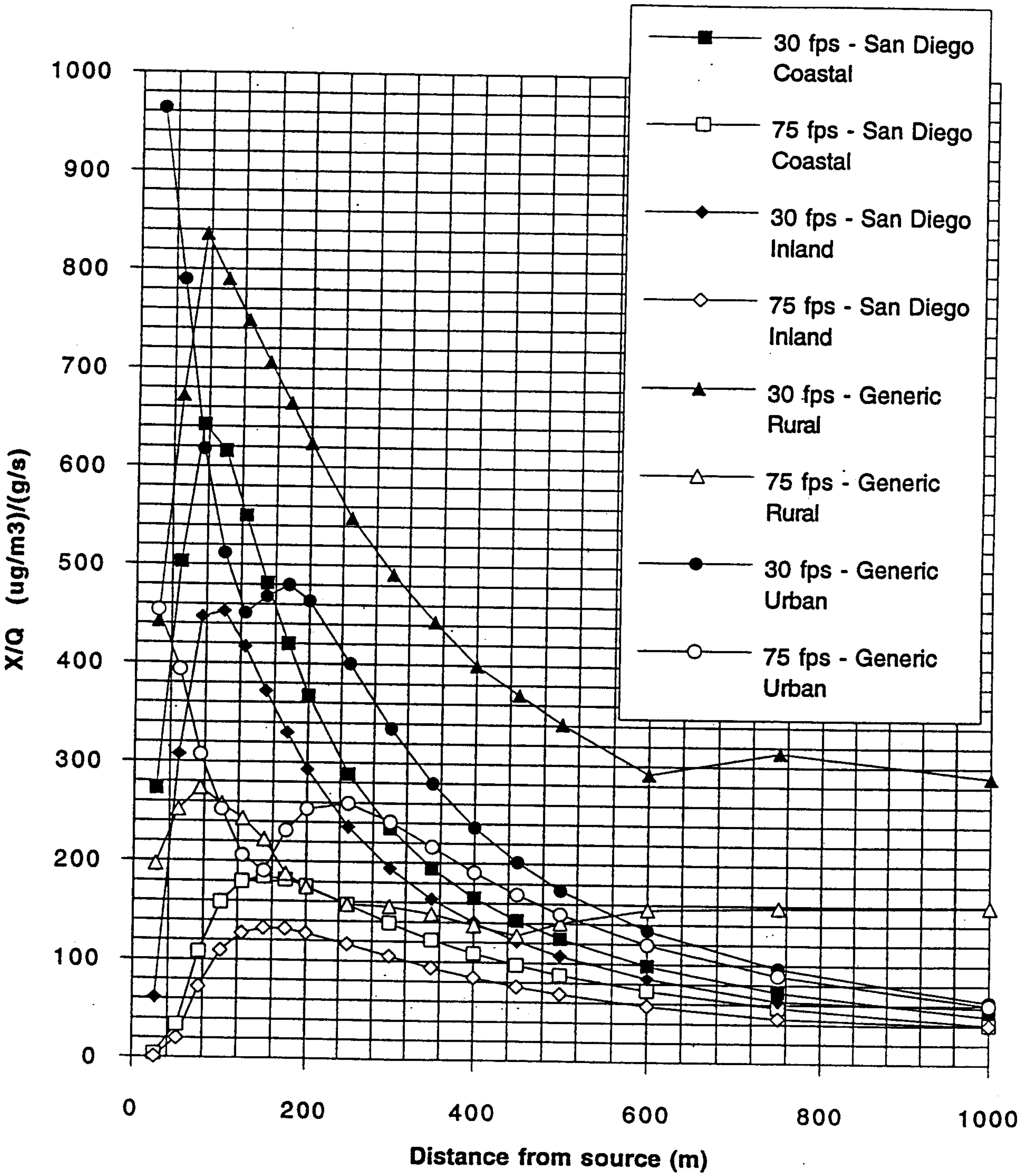
Effect of increasing stack height from 25 ft to 30 ft - exit velocity 30 fps - Hourly calculation



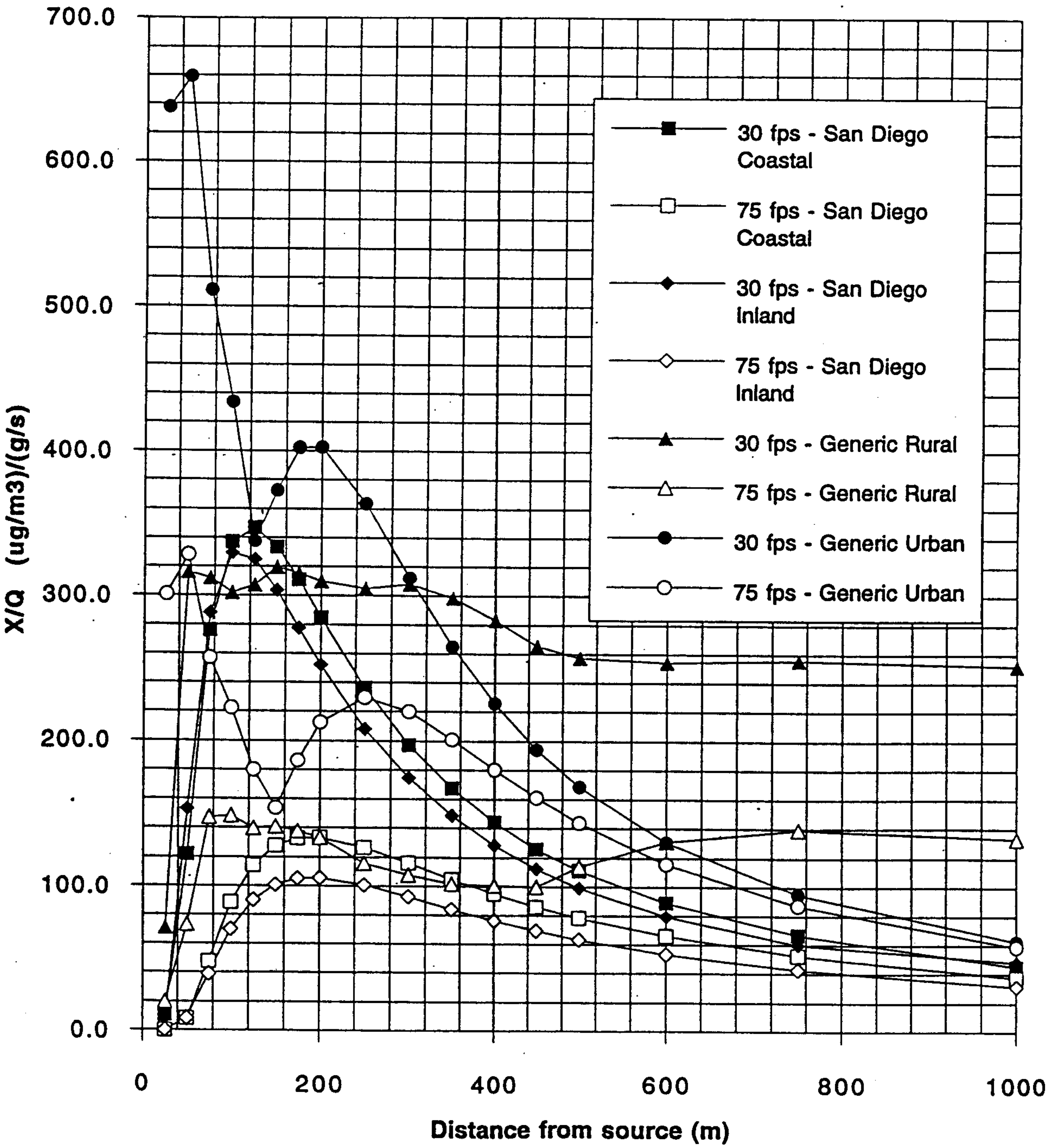
Effect of increasing stack height from 25 ft to 30 ft - exit velocity 75 fps - Hourly calculation



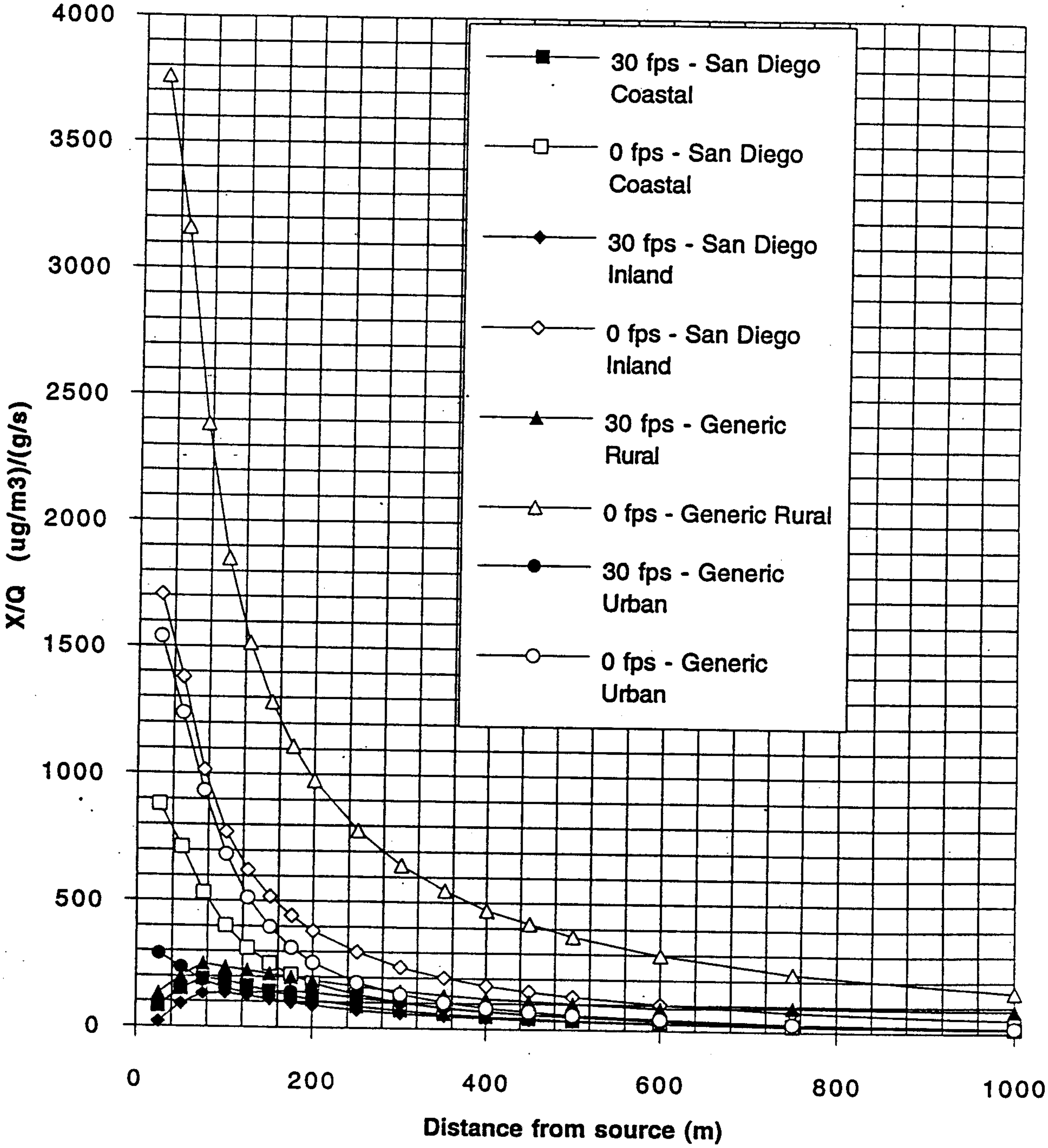
Effect of increasing exit velocity from 30 fps to 75 fps - 25 ft stack - Hourly calculation



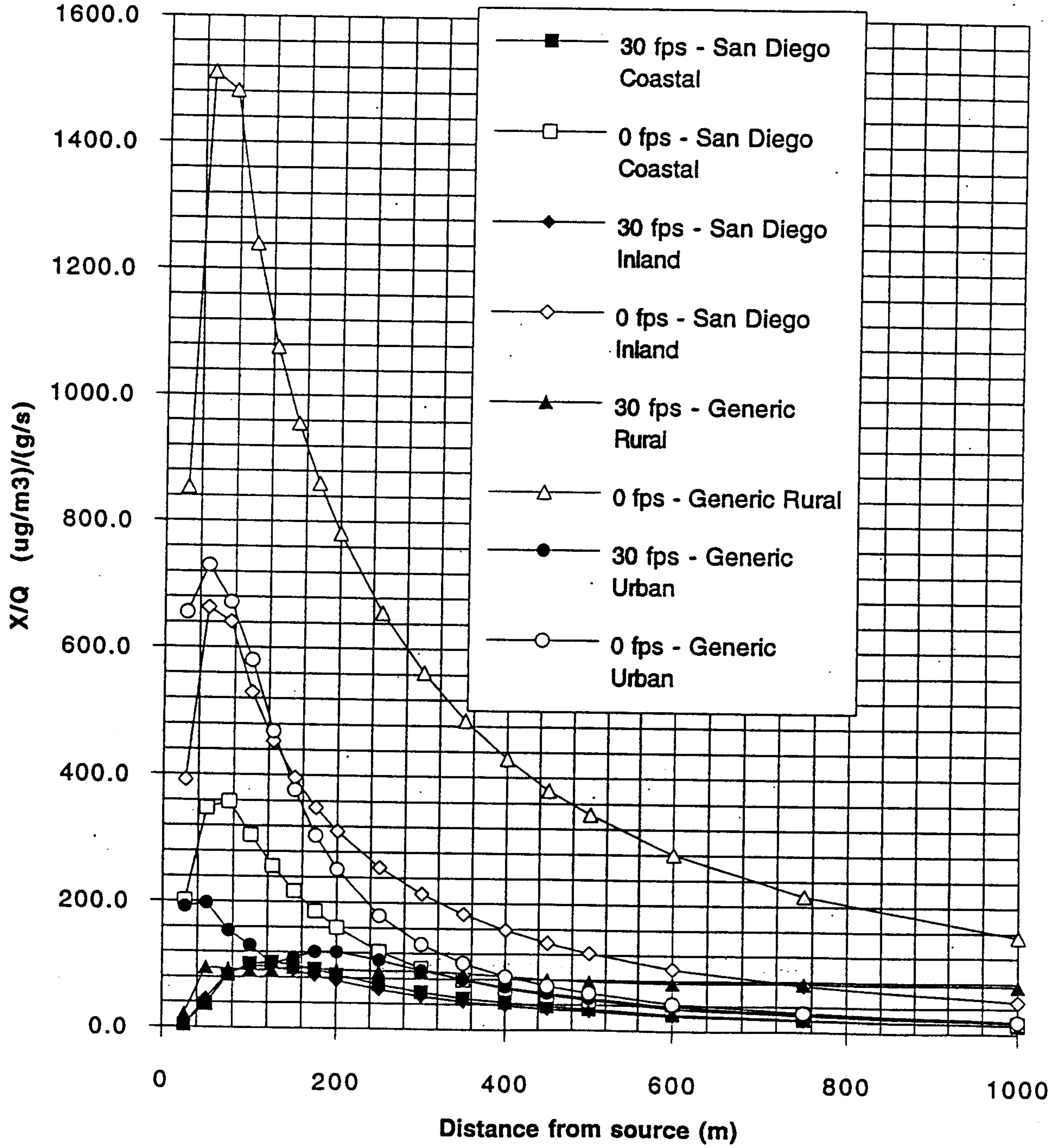
Effect of increasing exit velocity from 30 fps to 75 fps - 30 ft stack - Hourly calculation



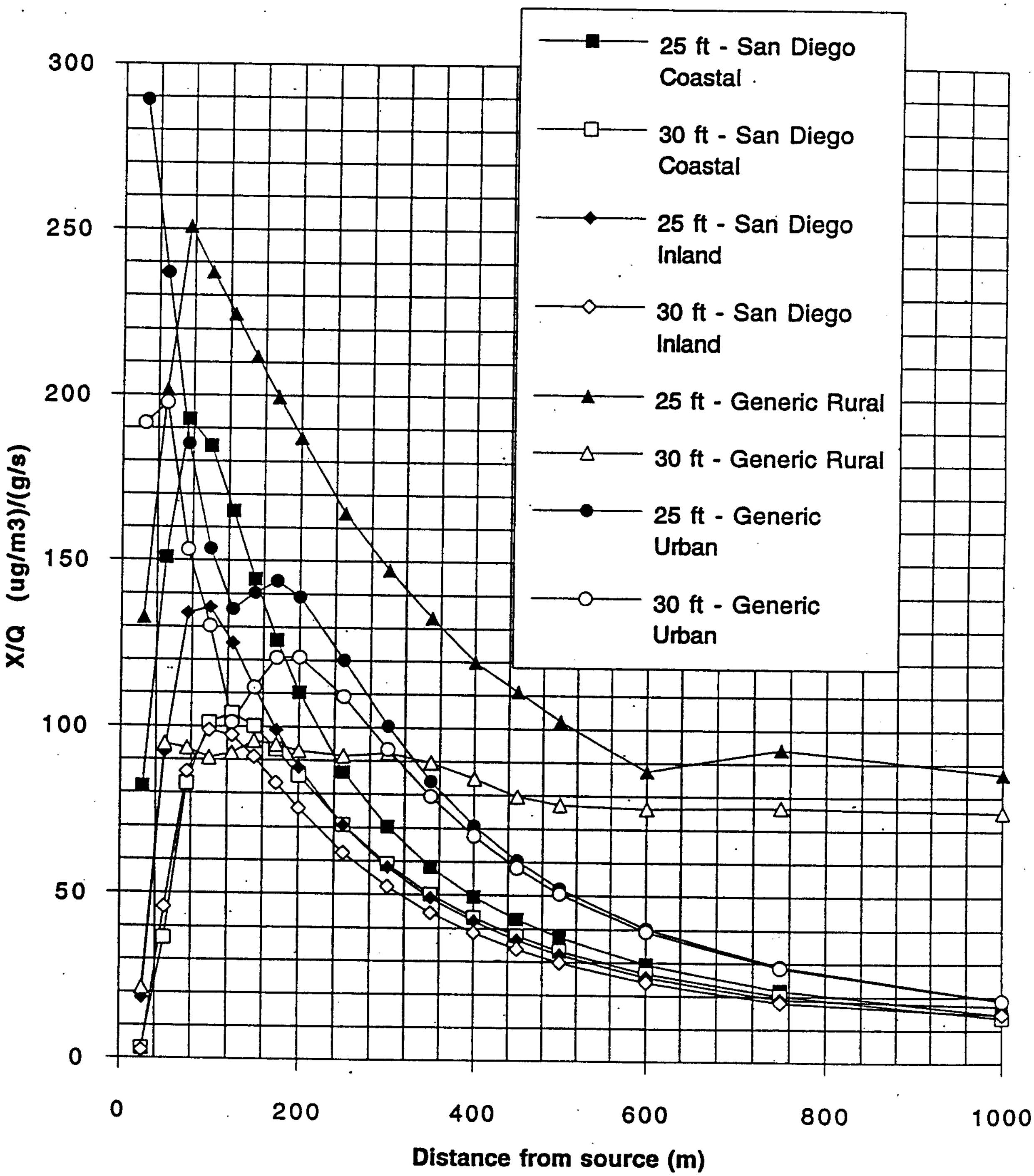
Effect of removing obstruction to vertical flow - 25 ft stack - Monthly calculation



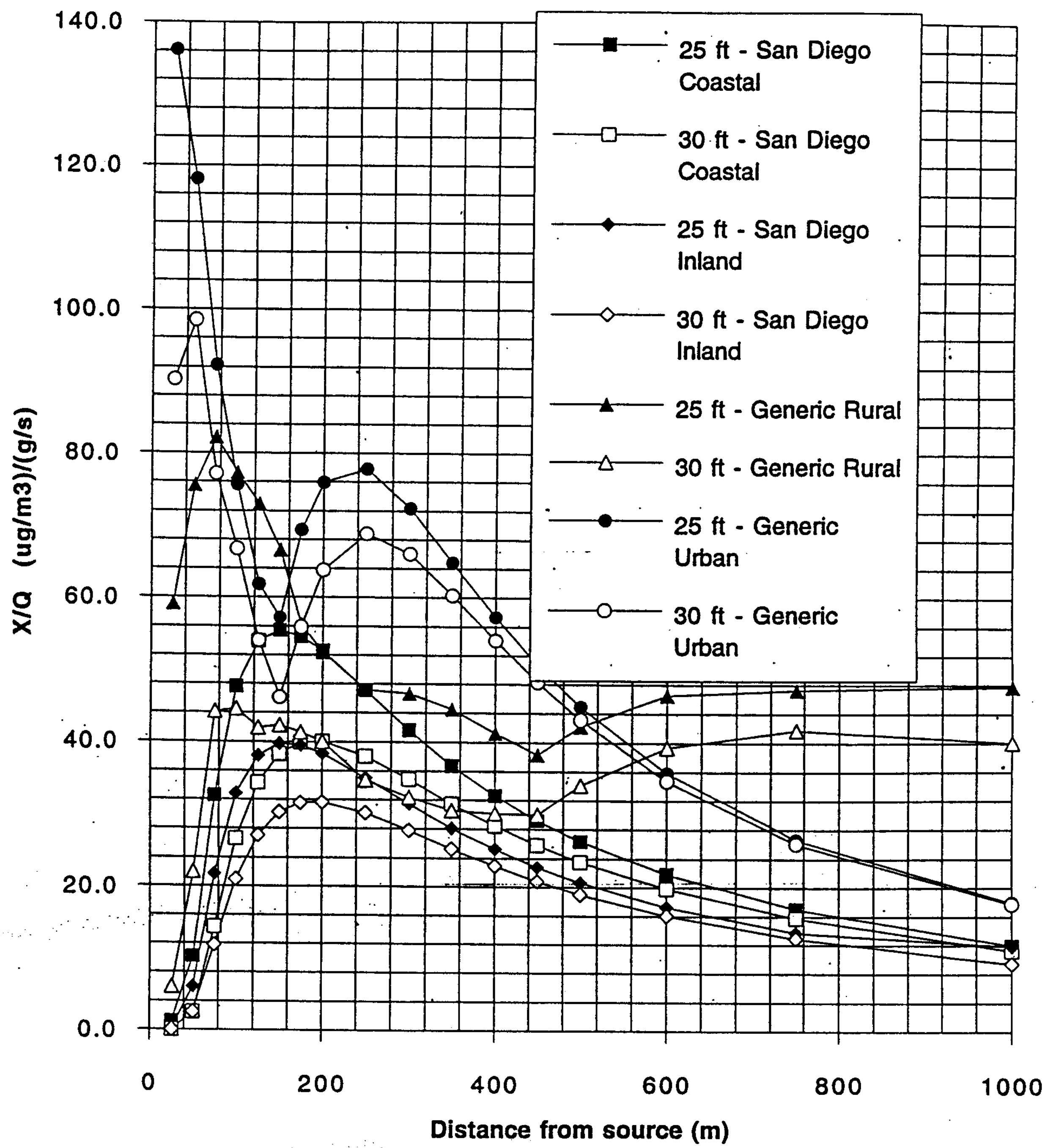
Effect of removing obstruction to vertical flow - 30 ft stack - Monthly calculation



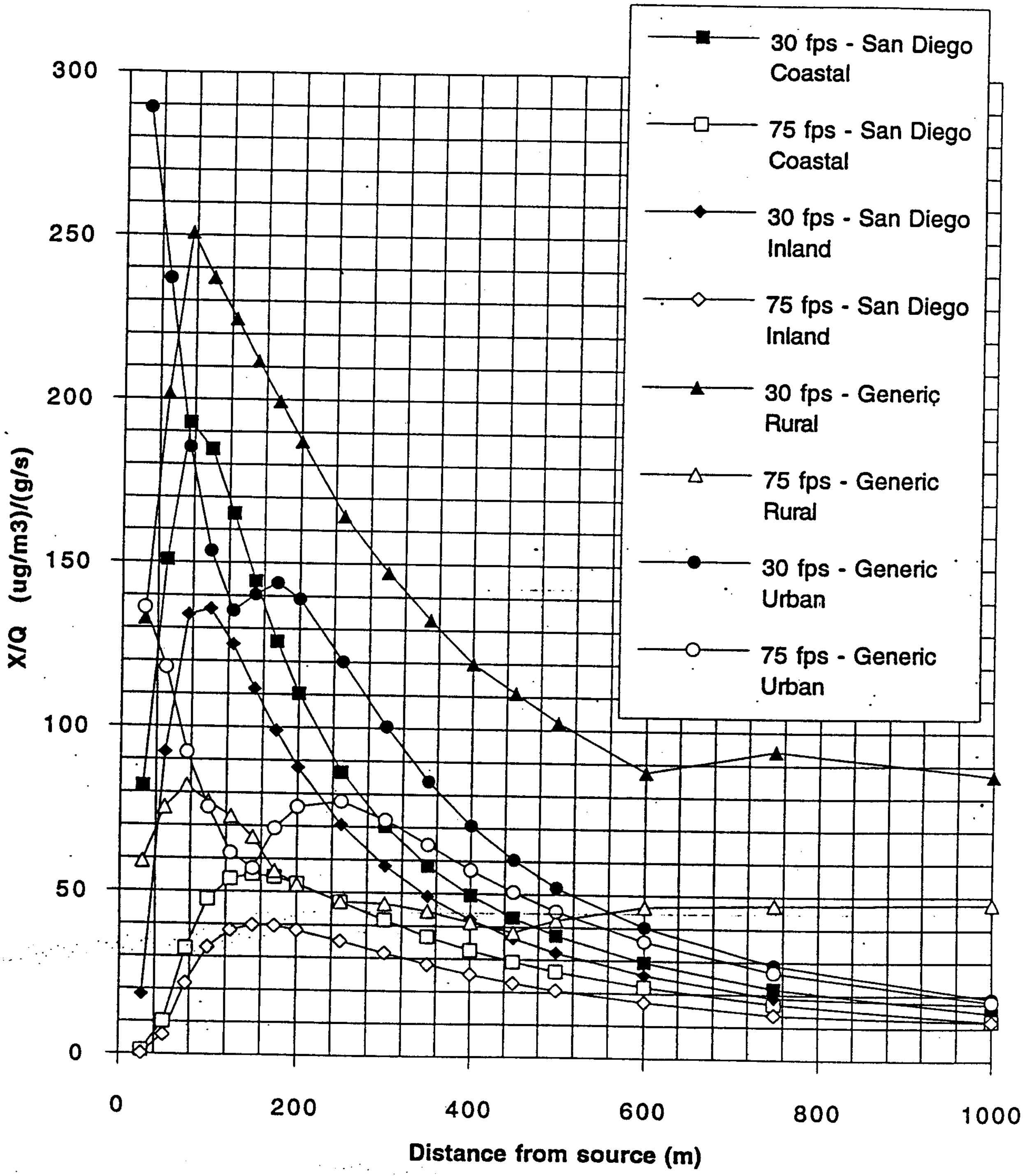
Effect of increasing stack height from 25 ft to 30 ft - exit velocity 30 fps - Monthly calculation



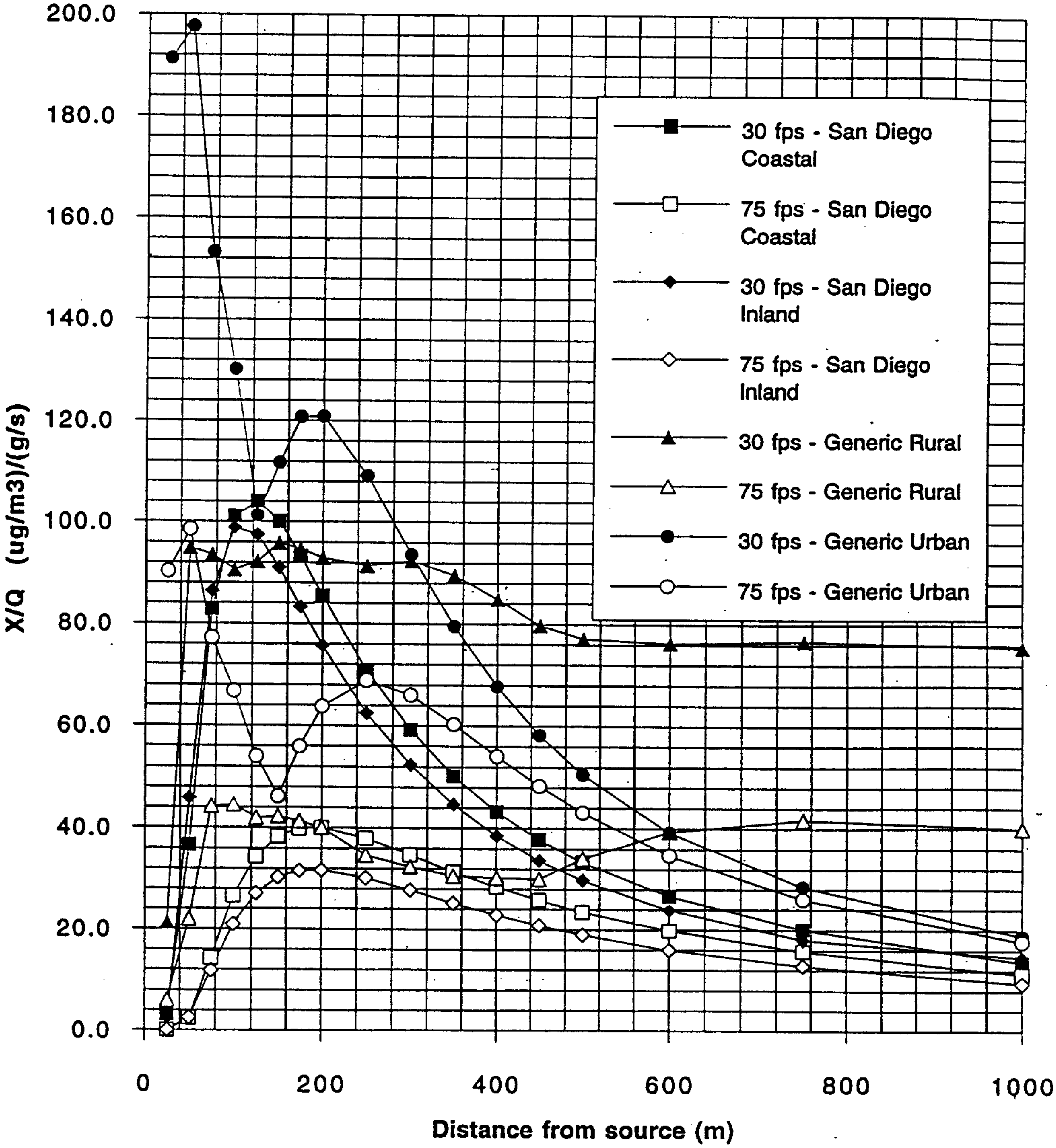
Effect of increasing stack height from 25 ft to 30 ft - exit velocity 75 fps - Monthly calculation



Effect of increasing exit velocity from 30 fps to 75 fps - 25 ft stack - Monthly calculation



Effect of increasing exit velocity from 30 fps to 75 fps - 30 ft stack - Monthly calculation



Appendix K: Detailed Results of Sample Risk Assessment

FACILITY TYPE: GENERIC AUTOBODY SHOP
HEALTH RISK ASSESSMENT
ASSUMPTIONS: TBACT: NO
ACCEPTABLE CRITERIA: ALLOWABLE CANCER RISK PER MILLION: 1.0
TBACT=1 NON-TBACT=10
HHI=1

CASE:	Stack	Raincap	Fugitive	
STACK HEIGHT (FEET)	25	25	Fugitive	
EXIT VELOCITY (FPS)	30	Downward	NA	
PARTICULATE CONTROL:	YES	YES	NO	
ANNUAL DISPERSION FACTOR:	69	1015	12616	(UG/M3/G/S)
HRLY MAXIMUM DISPERSION FACTOR:	868	12690	157700	(UG/M3/G/S)
MONTHLY DISPERSION FACTOR:	260	3807	47310	(UG/M3/G/S)

CHEMICAL NAME	No. of sites reporting usage of TAC	Maximum Usage at any one site lb/yr	Minimum Usage at any one Site lb/yr	Total lbs/yr of 39 reporting sites	Acute Emission Rate lb/hr	Ann Emiss rate of sites reporting usage of TAC lb/yr	Acute Emissions Rate g/s	Annual Emission Rate g/s	UNIT RISK FACTOR (m^3/ug)	CHRONIC REL (ug/m^3)	ACUTE REL (ug/m^3)	CANCER M-P FACTOR		CHRONIC M-P FACTOR	
												CONTR	UNCONTR	CONTR	UNCONTR
CADMIUM AND COMPOUNDS	0	0.0	0.0	0.0	0.0E+00	0.0	0.0E+00	0.0E+00	4.2E-03	3.5E+00		1.00	1.00	16.86	38.93
CHROMIUM (HEXAVALENT)	7	0.4	0.1	0.9	4.6E-06	0.13	5.8E-07	1.8E-06	1.4E-01	2.0E-03		1.01	1.03	1.00	1.00
COPPER AND COMPOUNDS	0	0.0	0.0	0.0	0.0E+00	0.0	0.0E+00	0.0E+00		2.4E+00	1.0E+01	1.00	1.00	1.00	1.00
ETHYLENE GLYCOL BUTYL ETHER	0	0.0	0.0	0.0	0.0E+00	0.0	0.0E+00	0.0E+00		2.0E+01	1.5E+03	1.00	1.00	1.00	1.00
LEAD AND COMPOUNDS (SUB-CHRONIC)	0	0.0	0.0	0.0	0.0E+00	0.0	0.0E+00	0.0E+00	1.2E-05	1.5E+00	1.5E+00	1.00	1.00	1.00	1.00
METHANOL	12	150.6	20.6	635.3	1.7E-03	52.9	2.2E-04	7.6E-04		6.2E+02		1.00	1.00	1.00	1.00
METHYLENE CHLORIDE	3	53.8	26.3	112.1	6.1E-04	37.4	7.7E-05	5.4E-04	1.0E-06	3.0E+03	3.5E+03	1.00	1.00	1.00	1.00
NICKEL AND NICKEL COMPOUNDS	0	0.0	0.0	0.0	0.0E+00	0.0	0.0E+00	0.0E+00	2.6E-04	2.4E-01	1.0E+00	1.00	1.00	1.00	1.00
STYRENE*	12	327.6	25.2	1043.5	3.7E-03	87.0	4.7E-04	1.3E-03	5.7E-07	7.0E+02		1.00	1.00	1.00	1.00
TOLUENE	37	1010.3	28.8	9487.5	1.2E-02	256.4	1.5E-03	3.7E-03		2.0E+02		1.00	1.00	1.00	1.00
XYLENES	38	1879.4	18.1	12689.2	2.1E-02	333.9	2.7E-03	4.8E-03		3.0E+02	4.4E+03	1.00	1.00	1.00	1.00
ZINC AND COMPOUNDS	0	0.0	0.0	0.0	0.0E+00	0.0	0.0E+00	0.0E+00		3.5E+01		1.00	1.00	1.00	1.00

NOTES:

Lead is analyzed as a subchonic HHI using monthly dispersion values. A factor of 0.3 was used to adjust the SCREEN2-calculated hourly maximum dispersion value to an assumed monthly maximum.

A factor of 0.08 was used to adjust the SCREEN2-calculated hourly maximum dispersion value to an assumed annual maximum.

Seven exit scenarios were modeled. The worst-case of the three representive scenarios are presented above. For example, stack case is the lower stack and lower exit velocity, and the raincap case is the lower stack.

Acceptable emission rate fraction may be multiplied by the usage rate to derive an acceptable usage which results in a de minimis risk.

SCREEN2 was run in the rural mode.

HHI screening calculation does not include consideration of impacts to specific targets, and therefore, is conservative.

The preliminary potency value for styrene was included in this analysis.

BASIS:

Inventory data is from an ABTF member District for the year 1991.

Acute emission rates are estimated at 10% of the annual usage rate at the facility reporting the maximum usage.

Dispersion values from SCREEN2 using the rural mode.

Other reported TACs used (per ABTF member District inventory) which were not evaluated:

acetone	methyl ethyl ketone
ethyl benzene	methyl isobutyl ketone
ethylene glycol monobutyl ether acetate	propylene glycol monomethyl ehter
isopropanol	propylene glycol monomethyl ether acetate

Appendix K: Detailed Results of Sample Risk Assessment (Continued)

CHEMICAL NAME	STACK			RAINCAP			FUGITIVE			PERCENT TAC CONTRIBUTION TO RISK		
	CANCER RISK PER MILLION	CHRONIC HEALTH HAZARD INDEX	ACUTE & SUBCHRONIC HAZARD INDEX	CANCER RISK PER MILLION	CHRONIC HEALTH HAZARD INDEX	ACUTE & SUBCHRONIC HAZARD INDEX	CANCER RISK PER MILLION	CHRONIC HEALTH HAZARD INDEX	ACUTE & SUBCHRONIC HAZARD INDEX	CANCER	CHRONIC HHI	ACUTE/ SUBCHRONIC HHI
CADMIUM AND COMPOUNDS	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0	0.0	0.0
CHROMIUM (HEXAVALENT)	1.8E+01	6.4E-02	0.0E+00	2.7E+02	9.4E-01	0.0E+00	3.4E+03	1.2E+01	0.0E+00	99.5	96.1	0.0
COPPER AND COMPOUNDS	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0	0.0	0.0
ETHYLENE GLYCOL BUTYL ETHER	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0	0.0	0.0
LEAD AND COMPOUNDS (SUB-CHRONIC)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0	0.0	0.0
METHANOL	0.0E+00	8.5E-05	0.0E+00	0.0E+00	1.2E-03	0.0E+00	0.0E+00	1.5E-02	0.0E+00	0.0	0.1	0.0
METHYLENE CHLORIDE	3.7E-02	1.2E-05	1.9E-05	5.5E-01	1.8E-04	2.8E-04	6.8E+00	2.3E-03	3.5E-03	0.2	0.0	3.5
NICKEL AND NICKEL COMPOUNDS	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0	0.0	0.0
STYRENE*	4.9E-02	1.2E-04	0.0E+00	7.2E-01	1.8E-03	0.0E+00	9.0E+00	2.3E-02	0.0E+00	0.3	0.2	0.0
TOLUENE	0.0E+00	1.3E-03	0.0E+00	0.0E+00	1.9E-02	0.0E+00	0.0E+00	2.3E-01	0.0E+00	0.0	1.9	0.0
XYLENES	0.0E+00	1.1E-03	5.3E-04	0.0E+00	1.6E-02	7.8E-03	0.0E+00	2.0E-01	9.7E-02	0.0	1.7	96.5
ZINC AND COMPOUNDS	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0	0.0	0.0
TOTAL:	1.8E+01	6.6E-02	5.5E-04	2.7E+02	9.8E-01	8.1E-03	3.4E+03	1.2E+01	1.0E-01	100.0	100.0	100.0
ACCEPTABLE CRITERIA:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
ACCEPTABLE:	NO	YES	YES	NO	YES	YES	NO	NO	YES			
TBACT SOURCE:	NO											

Appendix L - Scoping Assessment "Cookbook" for Districts

Following the flowchart in Appendix B, a prioritization and screening level health risk assessment was performed for a hypothetical auto bodyshop.

The basic steps include:

1. Determine emission rates.
2. Complete prioritization.
3. For high priority facilities, complete risk screening.

The following coating use data for a hypothetical facility was used for this example. It illustrates the type of data that might be submitted on a survey form like the one in Appendix F:

Table L-1
Coating Material Consumption Data

Coating Manufacturer	Coating Category	Use (gal/yr)
Sherwin Williams	Precoat-chromium formulation	5
Sherwin Williams	Precoat-no chromium formulation	20
Sherwin Williams	Primer Surfacer	60
Sherwin Williams	Color Coats-Pb/Cr formulation	30
Sherwin Williams	Color Coats-no Pb/Cr formulation	170
Sherwin Williams	Clear coat	100
Dupont	Solvent cleaner	25

Also from the survey form, we determine that all coating is applied in a closed spray booth with paper filters using an HVLP spray gun. The capture efficiency is therefore, 100%; the control efficiency is assumed to be 95%; and the fall-out fraction is 80%.

For this scoping level assessment, the generic coating profiles in Appendix E are used to determine the composition of the coatings used. Appropriate data from pages E-2, and E-8 through E-10 of appendix E, are illustrated in Table L-2, below.

Table L-2
Toxic Content of Coating Products,lb/gal

	Precoat-Cr	Precoat-no Cr	Primer surfacer	Colorcoat-Pb/Cr	Colorcoat-no Pb/Cr	Clearcoat	Solvent cleaner
chromeVI	0.05 Cr comp 0.24 $SrCrO_4$			0.42 Cr comp			
EGMBE		0.10		0.07			
EGMBEA	0.10			0.23		0.52	
ethbenzen	0.14	0.08	0.05	0.28		0.16	
IPA		0.24	0.30	0.51		0.58	0.59
lead				0.69 Pb comp			
MEK	0.14	0.19		1.11		0.80	
MeOH	•		0.12	0.17		0.13	
MIBK	0.48	0.36	0.49	0.50		0.38	
PGMEA		0.10	0.05	0.14		0.19	
toluene		0.91	2.34	0.86		1.13	0.95
xylene	0.72	0.43		1.34	0.07		
zinc		0.29 Zn comp					

The following equation (Equation 1, page 9) is used to determine the emissions of volatile organic compounds. For example, annual xylene emissions from chromium formulation precoat use are:

$5\ ^{gal}/_{yr} \times 0.72\ ^{lb\ xylene}/_{gal} = 3.6\ ^{lb}/_{yr}$

The following equation (Equation 2, page 14) is used to determine emissions of solids. For example, annual hexavalent chromium emissions from chromium formulation precoat use are:

$5\ ^{gal}/_{yr} \times 0.24\ ^{lb\ SrCrO_4}/_{gal} \times 0.255\ ^{lb\ Cr6}/_{lb\ SrCrO4} \times (1\text{-}0.8) \times (1\text{-}0.95) = 0.0031\ ^{lb}/_{yr}$

and

$142\ ^{gal}/_{yr} \times 0.05\ ^{lb\ Cr\ comp}/_{gal} \times 1\ ^{lb\ Cr6}/_{lb\ Cr\ comp} \times (1-0.8) \times (1-0.95) = 0.0025\ ^{lb}/_{yr}$

Note that for screening purposes, as a worst case, it is assumed that unidentified chromium compounds are 100% hexavalent chromium.

The total hexavalent chromium compound emissions from precoat use are:

$0.0031\ ^{lb}/_{yr} + 0.0025\ ^{lb}/_{yr} = 0.0056\ ^{lb}/_{yr}$

The results of similar calculations for all compounds emitted from all coatings used at the composite facility are summarized in Table L-3.

Table L-3
Toxic Emissions by Coating Product, lb/year

	Precoat-Cr	Precoat-no Cr	Primer surfacer	Colorcoat-Pb/Cr	Colorcoat-no Pb/Cr	Clearcoat	Solvent cleaner
chromeVI	0.0056			0.13			
EGMBE		2.0		2.1			
EGMBEA	1.7			6.9		52.0	
ethbenzen	2.4	1.6	3.0	8.4		16.0	
IPA		4.8	18.0	15.3		58.0	15.0
lead				0.21			
MEK	0.7	3.8		33.3		80.0	
MeOH			7.2	5.1		13.0	
MIBK	2.4	7.2	29.4	15.0		38.0	
PGMEA			3.0	4.2		19.0	
toluene		18.2	140.4	25.8		113.0	23.7
xylene	3.6	8.6		40.2	11.9		
Zinc		0.06					

In the absence of site specific data, maximum 1-hour emission rates from the facility can be estimated by assuming a maximum of one gallon of material is used in an hour. Hourly emissions are based on the highest toxic compound content in any product for each compound.

The total emissions from the composite facility are summarized in Table L-4.

Table L-4
Scoping Level Emission Rates

Compound	pounds per year	pounds per hour
chrome VI	0.14	0.0066
EGMBE	4.1	0.07
EGMBEA	60.6	0.52
ethylbenzene	31.4	0.28
IPA	111.1	0.59
lead	0.21	0.018 lb/mo
MEK	117.8	1.11
methanol	25.3	0.17
MIBK	92.0	0.50
PGMEA	45.2	0.19
toluene	321.1	2.34
xylenes	64.3	1.34
zinc	0.06	0.003

Using default receptor proximity factor of 1 (receptor proximity of 100 meters), a priority score is calculated using the equations in Appendix I. The priority score calculation is summarized in Table L-5. The calculation gives a priority score of 323.69, which is high priority. For an actual facility, the next step in the process is to determine the actual receptor proximity and refine the priority score, if applicable, using the receptor proximity factors in Table I-I. For this example, it is assumed that there is a receptor within 100 meters of the facility, and therefore, the facility remains high priority.

The dispersion modeling results tables in Table 5 and/or Appendix J and the toxicity data in Appendix C can be used to perform a scoping level health risk assessment.

First, determine which modeling scenario best fits the facility. For this example, we will assume Scenario 5, the 25-ft stack with the raincap best matches the actual configuration of the facility. The stack is located in a rural locale. Particulate emissions are controlled.

Calculations are done separately for cancer, chronic noncancer, and acute noncancer risks.

Table L-5
Risk Prioritization Analysis

****

FACILITY: Bodyshop XYX - Permit #1234 RP FACTOR: 1.000 (ARB APPROACH: 99 METERS)

LOCATION: Anywhere, CA COMPLIANCE ADJUSTMENT: 1.0

****

POLLUTANTS WITH ESTABLISHED AB 2588 TOXICITY DATA

POLLUTANT	ANNUAL EMISSIONS (lb/yr)	UNIT RISK (µg/m3)-1	CARCINOGEN SCORE	ANNUAL EMISSIONS (lb/hr)	CHRONIC AEL (µg/m3)	CHRONIC NONCARC SCORE	ACUTE EMISSIONS (lb/hr)	ACUTE AEL (µg/m3)	ACUTE NONCARC SCORE	MAX NONCARC SCORE
Chromium (hex.)	0.14	.14E+00	33.32	0.0000	.20E - 02	1.5441	0.0066	.00E+00	0.0000	1.5441
Ethylglycbutyl eth	4.1	.00E+00	.00	0.0005	.20E+02	0.0035	0.0700	.15E+04	0.0700	0.0700
Ethylbenzene	31.4	.00E+00	.00	0.0036	.10E+04	0.0005	0.2800	.00E+00	0.0000	0.0005
Isopropanol	111.1	.00E+00	.00	0.0127	.00E+00	0.0000	0.5900	.49E+05	0.0181	0.0181
Lead	0.21	.12E - 04	.00	0.0000	.15E+01	0.0024	0.0580	.00E+00	0.0000	0.0024
MEK	117.8	.00E+00	.00	0.0134	.10E+04	0.0020	1.1100	.12E+05	0.1388	0.1388
Methanol	25.3	.00E+00	.00	0.0029	.62E+03	0.0007	0.1700	.28E+05	0.0091	0.0091
Toluene	321.1	.00E+00	.00	0.0367	.20E+03	0.0275	2.3400	.37E+05	0.0949	0.0949
Xylenes	64.3	.00E+00	.00	0.0073	.30E+03	0.0037	1.3400	.44E+04	0.4568	0.4568
Zinc	0.06	.00E+00	.00	0.0000	.35E+02	0.0000	0.0030	.00E+00	0.0000	0.0000

POLLUTANTS WITHOUT ESTABLISHED AB 2588 TOXICITY DATA

Ethglybutethac	60.6
MIBK	92.0
Propglymethethac	45.2

****

TOTAL CARCINOGENIC SCORE = 33.32

TOTAL NONCARCINOGENIC SCORE = 2.33

TOTAL FACILITY TOXICS SCORE = 33.32

****

FACILITY RISK ASSESSMENT PRIORITY =

******************* ----> TS $\geq$ 10. : HIGH

***** HIGH ***** ----> 1.0 $\leq$ TS < 10. : INTERMEDIATE

******************* ----> TS < 1.0 : LOW

TOTAL CARCINOGENIC EMISSIONS = 0.35 LB/YR

TOTAL O3 DEPLETER EMISSIONS = .00 LB/YR

TOTAL APPENDIX A-1 EMISSIONS = 873.31 LB/YR

Cancer Risk

Equation 4, page 26, is used to calculate the lifetime excess cancer risk.

From Table 5, the maximum annual relative dispersion factor at or beyond 10 m from the source for Scenario 5 is 1.5 x 10-2 $\mu g/m^3$ per lb/yr for a rural area. This is multiplied by the actual annual emissions from the facility in grams per second to determine the annual average concentration of each compound. The annual average concentration of each compound is multiplied by the unit risk factor and multipathway factor as appropriate.

Note that use of preliminary potency values is at the discretion of the District. This is illustrated in Table L-6.

Chronic noncancer

Equation 5, page 27, is used to calculate the noncancer chronic hazard index.

From Table 5, the maximum annual relative dispersion factor at or beyond 10 m from the source for Scenario 5 is 1.5×10^{-2} $\mu g/m^3$ per lb/yr for a rural area. This is multiplied by the actual annual emissions from the facility to determine the annual average concentration of each compound. The annual average concentration of each compound is multiplied by the multipathway factor and divided by the reference exposure level as appropriate. This is illustrated in Table L-7.

Acute noncancer

Equation 6, page 28, is used to calculate the noncancer acute hazard index.

From Table 5, the maximum 1-hour relative dispersion factor at or beyond 10 m from the source for Scenario 5 is 1.6×10^3 $\mu g/m^3$ per lb/hr for a rural area. This is multiplied by the actual maximum hourly emissions from the facility to determine the maximum 1-hour concentration of each compound. The maximum 1-hour concentration of each compound is divided by the reference exposure level as appropriate. Note that use of proposed REL values is at the discretion of the District. This is illustrated in Table L-8.

For lead, the maximum monthly relative dispersion factor at or beyond 10 m from the source for Scenario 5 is 0.667 $\mu g/m^3$ per lb/hr for a rural area. This is multiplied by the monthly lead emissions from the facility to determine the maximum 30-day concentration of lead. The maximum 30-day concentration of lead is divided by the reference exposure level. This is also illustrated in Table L-8.

Table L-6. Example Carcinogenic Risk Calculation

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: **RURAL** or **URBAN**
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/yr	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban
1	25	30	1.0E-03	1.1E-03
2	30	30	3.8E-04	7.9E-04
3	25	75	3.2E-04	5.2E-04
4	30	75	1.8E-04	3.8E-04
5	25	Raincap	1.5E-02	6.1E-03
6	30	Raincap	6.5E-03	3.0E-03
7	Fugitive	Fugitive	1.8E-01	1.3E-01

4. Transfer appropriate X/Q values and emission rates into table below.
5. Identify source as controlled or uncontrolled: **CONTROLLED** or **UNCONTROLLED**
6. Multiply emission rate, X/Q, unit risk factor and multipathway factor (either controlled or uncontrolled) for each toxicant. List product as Individual Excess Cancer Risk.
7. Sum Individual Excess Cancer Risk for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If this is exceeded, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/yr)	X/Q (ug/m3 per lb/yr)	TOXICITY DATA FOR CANCER EVALUATIONS				INDIV EXCESS CANCER RISK
				UNIT RISK FACTOR (m^3/ug)	PRELIM. POTENCY VALUE (1) (m^3/ug)	MULTIPATHWAY FACTOR (2)		
						CONTR	UNCONTR	
CADMIUM AND COMPOUNDS	7440-43-9		1.5E-02	4.2E-03	NA	1.00	1.00	0.00E+00
CHROMIUM (HEXAVALENT)	18540-29-9	0.1	1.5E-02	1.4E-01	NA	1.01	1.03	2.97E-04
LEAD AND COMPOUNDS	7439-92-1	0.2	1.5E-02	1.2E-05	NA	1.00	1.00	3.78E-08
METHYLENE CHLORIDE	75-09-2		1.5E-02	1.0E-06	NA	1.00	1.00	0.00E+00
NICKEL AND NICKEL COMPOUNDS	7440-02-0		1.5E-02	2.6E-04	NA	1.00	1.00	0.00E+00
				SUMMATION FOR ALL TOXICANTS				2.97E-04

NOTES:

1. Preliminary potency values should be used at the discretion of the District.
2. Multipathway factors are the ratio of the total risk to inhalation risk. These have been developed using HRA92, version 1.1, a multipathway exposure model developed jointly by the California Air Resources Board and the Office of Environmental Health Hazard Assessment. Assumptions and parameters used to develop the the multipathway factors include:
   - Emission rate = 1 g/s
   - X/Q = 1
   - Deposition velocity = 0.02 m/s for controlled sources and 0.05 m/s for uncontrolled sources
   - 70-year exposure
   - Fraction of homegrown fruits and vegetables consumed = 10%
   - Pathways/sources include inhalation, ingestion of soil (pica), homegrown vegetables, mother's milk (for one year) and skin contact.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

Table L-7. Example Non-Cancer Chronic Health Hazard Index Evaluation

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: RURAL or URBAN
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/yr	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban
1	25	30	1.0E-03	1.1E-03
2	30	30	3.8E-04	7.9E-04
3	25	75	3.2E-04	5.2E-04
4	30	75	1.8E-04	3.8E-04
5	25	Raincap	1.5E-02	6.1E-03
6	30	Raincap	6.5E-03	3.0E-03
7	Fugitive	Fugitive	1.8E-01	1.3E-01

4. Transfer appropriate X/Q values and emission rates into table below.
5. Identify source as controlled or uncontrolled: CONTROLLED or UNCONTROLLED
6. For each toxicant, multiply emission rate, X/Q, and multipathway factor (either controlled or uncontrolled). Divide that product by the REL for each toxicant. List product as Chronic Health Hazard Index.
7. Sum Hazard Index for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If summation exceeds 1, sum individually for each toxic endpoint and record maximum endpoint and endpoint-specific HHI. If value exceeds 1, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/yr)	X/Q (ug/m3 per lb/yr)	TOXICITY DATA FOR NON-CANCER CHRONIC EVALUATIONS										CHRONIC HEALTH HAZARD INDEX
				REL (ug/m^3)	MULTIPATHWAY FACTOR (1)		SYSTEM OR ORGAN EFFECTED							
					CONTR	UNCONTR	CV/ BL	CNS/ PNS	IMMU	KIDN	GI/ LV	REPRO	RESP	
CADMIUM AND COMPOUNDS	7440-43-9		1.5E-02	3.5E+00	16.86	38.93				X			X	0.0000
CHROMIUM (HEXAVALENT)	18540-29-9	0.1	1.5E-02	2.0E-03	1.00	1.00				X	X		X	1.0500
COPPER AND COMPOUNDS	7440-50-8		1.5E-02	2.4E+00	1.00	1.00							X	0.0000
ETHYLENE GLYCOL (MONO)-BUTYL ETHER	111-76-2	4	1.5E-02	6.4E+01	1.00	1.00								0.0010
ETHYL BENZENE	100-41-4	31	1.5E-02	1.0E+03	1.00	1.00						X		0.0005
LEAD AND COMPOUNDS	7439-92-1	0.2	1.5E-02	1.5E+00	1.00	1.00	X	X	X	X		X		0.0021
METHYL ETHYL KETONE	78-93-3	117.8	1.5E-02	1.0E+03	1.00	1.00						X		0.0018
METHANOL	67-56-1	25	1.5E-02	6.2E+02	1.00	1.00		X						0.0006
METHYLENE CHLORIDE	75-09-2		1.5E-02	3.0E+03	1.00	1.00		X			X			0.0000
NICKEL AND NICKEL COMPOUNDS	7440-02-0		1.5E-02	2.4E-01	1.00	1.00			X	X			X	0.0000
PROPYLENE GLYCOL (MONO)-METHYL ETHER	107-98-2		1.5E-02	2.0E+03	1.00	1.00		X						0.0000
STYRENE	100-42-5		1.5E-02	7.0E+02	1.00	1.00					X			0.0000
TOLUENE	108-88-3	321	1.5E-02	2.0E+02	1.00	1.00		X				X		0.0241
XYLENES (M.O.P ISOMERS)	1210	64	1.5E-02	3.0E+02	1.00	1.00						X	X	0.0032
ZINC AND COMPOUNDS	7440-66-6	0.1	1.5E-02	3.5E+01	1.00	1.00	X						X	0.0000
									SUMMATION FOR ALL TOXICANTS					1.0532
									PRIMARY TOXIC ENDPOINT					RESP

NOTES:

1. Multipathway factors are the ratio of the total risk to inhalation risk. These have been developed using HRA92, version 1.1, a multipathway exposure model developed jointly by the California Air Resources Board and the Office of Environmental Health Hazard Assessment. Assumptions and parameters used to develop the the multipathway factors include:
   - Emission rate = 1 g/s
   - X/Q = 1
   - Deposition velocity = 0.02 m/s for controlled sources and 0.05 m/s for uncontrolled sources
   - 70-year exposure
   - Fraction of homegrown fruits and vegetables consumed = 10%
   - Pathways/sources include inhalation, ingestion of soil (pica), homegrown vegetables, mother's milk (for one year) and skin contact.
2. A multipathway factor of 1.00 should be used to calculate the non-cancer chronic hazard index for the respiratory endpoint.
3. NA = Not available.
4. Values in brackets [ ] are proposed and are for informational purposes. Several of the revised acute RELs are higher than the previous values meaning that the acute HHI for the chemical will decrease. The numbers are not official until after Scientific Review Panel review and adoption by OEHHA.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

Table L-8. Example Non-Cancer Acute Health Hazard Index Evaluation

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: RURAL or URBAN
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/hr		Max X/Q in lb/mo	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban	Rural	Urban
1	25	30	110	122	0.046	0.051
2	30	30	41	86	0.017	0.036
3	25	75	35	58	0.014	0.024
4	30	75	19	41	0.008	0.017
5	25	Raincap	1603	667	0.667	0.278
6	30	Raincap	711	324	0.296	0.135
7	Fugitive	Fugitive	19918	14626	8.287	6.085

4. Transfer appropriate X/Q values and emission rates into table below. Use the monthly X/Q value and maximum monthly emission rate (lb/mo) for lead only.
5. Identify source as controlled or uncontrolled: CONTROLLED or UNCONTROLLED
6. For each toxicant, multiply emission rate, and X/Q. Divide that product by the REL for each toxicant. List product as Acute Health Hazard Index.
7. Sum Hazard Index for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If summation exceeds 1, sum individually for each toxic endpoint and record maximum endpoint and endpoint-specific HHI. If value exceeds 1, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/hr) (lb/mo for lead)	X/Q (ug/m3 per lb/hr)	TOXICITY DATA FOR ACUTE EVALUATIONS: ACUTE REL (ug/m^3)	TOXIC ENDPOINT OR TARGET ORGAN: CNS/ PNS	IMMUN	REPRO/ DEV'L	RESP	EYE	ACUTE HEALTH HAZARD INDEX
COPPER AND COMPOUNDS	7440-50-8		1603	1.0E+01 [1.0E+2]				X		
ETHYLENE GLYCOL (MONO)BUTYL ETHER (BUTYL CELLOSOLVE, 2-BUTOXYETHANOL)	111-76-2	0.1	1603	1.5E+03 [5.5E+3]			X	X		0.075
ISOPROPANOL	67-63-0	0.6	1603	[4.9E+4]				X	X	0.019
LEAD AND COMPOUNDS	7439-92-1	0.00	0.667	1.5 (2)	X					0.001
METHANOL	67-56-1	0.2	1603	[2.8E+4]	X					0.010
METHYLENE CHLORIDE	75-09-2		1603	3.5E+03 [8.3E+4]	X					
METHYL ETHYL KETONE	78-93-3	1.1	1603	[1.2E+4]				X		0.148
NICKEL AND NICKEL COMPOUNDS	7440-02-0		1603	1.0E+00 [3.3E+0]		X				
STYRENE	100-42-5		1603	[2.2E+4]				X	X	
TOLUENE	108-88-3	2.3	1603	[3.7E+4]				X		0.101
XYLENES (M,O,P ISOMERS)	1210	1.3	1603	4.4E+03 [2.2E+3]				X		0.488
				SUMMATION FOR ALL TOXICANTS						0.832
				PRIMARY TOXIC ENDPOINT						RESP

NOTES:

1. Values in brackets [ ] are proposed and are for informational purposes. Several of the revised acute RELs are higher than the previous values meaning that the acute HHI for the chemical will decrease. The numbers are not official until after Scientific Review Panel review and adoption by OEHHA.
2. Lead should be evaluated as a sub-chronic or 30-day exposure.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

In many Districts, the calculated risks would be considered significant. These risks were, however, based on the maximum relative dispersion factors at or beyond 10 meters from the source. An initial refinement of the screening assessment would be to determine the actual minimum distance from the stack to the property line or the nearest actual receptor. If this distance is greater than 10 meters, screening level risks could be calculated based on the actual receptor distance using the relative dispersion factors in Appendix J, Tables J-4 through J-9 instead of the values in Table 5. Additionally, before requiring public notification, the Guidelines suggest that the scoping level risk assessment be refined by determining site specific emission data, using site specific release data, and using actual local meteorological data. A refined health risk assessment is beyond the scope of this example.

Calculations may be facilitated by use of tables, either hardcopy or in a spreadsheet, similar to the example Tables L-6 through L-8. Blank copies of these table are Tables L-9 through L-11.

After appropriate refinement and finalization of the emissions and release data, it should be submitted to CARB. The format for data submittal is described in Appendix K.

Table L-9. Carcinogenic Risk Worksheet

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: **RURAL** or **URBAN**
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/yr	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban
1	25	30	1.0E-03	1.1E-03
2	30	30	3.8E-04	7.9E-04
3	25	75	3.2E-04	5.2E-04
4	30	75	1.8E-04	3.8E-04
5	25	Raincap	1.5E-02	6.1E-03
6	30	Raincap	6.5E-03	3.0E-03
7	Fugitive	Fugitive	1.8E-01	1.3E-01

4. Transfer appropriate X/Q values and emission rates into table below.
5. Identify source as controlled or uncontrolled: **CONTROLLED** or **UNCONTROLLED**
6. Multiply emission rate, X/Q, unit risk factor and multipathway factor (either controlled or uncontrolled) for each toxicant. List product as Individual Excess Cancer Risk.
7. Sum Individual Excess Cancer Risk for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If this is exceeded, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/yr)	X/Q (ug/m3 per lb/yr)	TOXICITY DATA FOR CANCER EVALUATIONS				INDIV EXCESS CANCER RISK
				UNIT RISK FACTOR (m^3/ug)	PRELIM. POTENCY VALUE (1) (m^3/ug)	MULTIPATHWAY FACTOR (2)		
						CONTR	UNCONTR	
CADMIUM AND COMPOUNDS	7440-43-9			4.2E-03	NA	1.00	1.00	
CHROMIUM (HEXAVALENT)	18540-29-9			1.4E-01	NA	1.01	1.03	
LEAD AND COMPOUNDS	7439-92-1			1.2E-05	NA	1.00	1.00	
METHYLENE CHLORIDE	75-09-2			1.0E-06	NA	1.00	1.00	
NICKEL AND NICKEL COMPOUNDS	7440-02-0			2.6E-04	NA	1.00	1.00	
				SUMMATION FOR ALL TOXICANTS				

NOTES:

1. Preliminary potency values should be used at the discretion of the District.
2. Multipathway factors are the ratio of the total risk to inhalation risk. These have been developed using HRA92, version 1.1, a multipathway exposure model developed jointly by the California Air Resources Board and the Office of Environmental Health Hazard Assessment. Assumptions and parameters used to develop the the multipathway factors include:
   - Emission rate = 1 g/s
   - X/Q = 1
   - Deposition velocity = 0.02 m/s for controlled sources and 0.05 m/s for uncontrolled sources
   - 70-year exposure
   - Fraction of homegrown fruits and vegetables consumed = 10%
   - Pathways/sources include inhalation, ingestion of soil (pica), homegrown vegetables, mother's milk (for one year) and skin contact.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

Table L-10. Non-Cancer Chronic Health Hazard Index Worksheet

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: RURAL or URBAN
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/yr	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban
1	25	30	1.0E-03	1.1E-03
2	30	30	3.8E-04	7.9E-04
3	25	75	3.2E-04	5.2E-04
4	30	75	1.8E-04	3.8E-04
5	25	Raincap	1.5E-02	6.1E-03
6	30	Raincap	6.5E-03	3.0E-03
7	Fugitive	Fugitive	1.8E-01	1.3E-01

4. Transfer appropriate X/Q values and emission rates into table below.
5. Identify source as controlled or uncontrolled: CONTROLLED or UNCONTROLLED
6. For each toxicant, multiply emission rate, X/Q, and multipathway factor (either controlled or uncontrolled). Divide that product by the REL for each toxicant. List product as Chronic Health Hazard Index.
7. Sum Hazard Index for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If summation exceeds 1, sum individually for each toxic endpoint and record maximum endpoint and endpoint-specific HHI. If value exceeds 1, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/yr)	X/Q (ug/m3 per lb/yr)	TOXICITY DATA FOR NON-CANCER CHRONIC EVALUATIONS										CHRONIC HEALTH HAZARD INDEX
				REL (ug/m^3)	MULTIPATHWAY FACTOR (1)		SYSTEM OR ORGAN EFFECTED							
					CONTR	UNCONTR	CV/BL	CNS/PNS	IMMU	KIDN	GI/LV	REPR	RESP	
CADMIUM AND COMPOUNDS	7440-43-9			3.5E+00	16.86	38.93				X			X (2)	
CHROMIUM (HEXAVALENT)	18540-29-9			2.0E-03	1.00	1.00				X	X		X	
COPPER AND COMPOUNDS	7440-50-8			2.4E+00	1.00	1.00							X	
ETHYLENE GLYCOL (MONO)-BUTYL ETHER	111-76-2			2.0E+01	1.00	1.00						X	X	
ETHYL BENZENE	100-41-4			1.0E+03	1.00	1.00						X		
LEAD AND COMPOUNDS	7439-92-1			1.5E+00	1.00	1.00	X	X	X	X		X		
METHYL ETHYL KETONE	78-93-3			1.0E+03	1.00	1.00						X		
METHANOL	67-56-1			6.2E+02	1.00	1.00		X						
METHYLENE CHLORIDE	75-09-2			3.0E+03	1.00	1.00		X			X			
NICKEL AND NICKEL COMPOUNDS	7440-02-0			2.4E-01	1.00	1.00			X	X			X	
PROPYLENE GLYCOL (MONO) METHYL ETHER	107-98-2			2.0E+03	1.00	1.00		X						
STYRENE	100-42-5			7.0E+02	1.00	1.00					X			
TOLUENE	108-88-3			2.0E+02	1.00	1.00		X				X		
XYLENES (M,O,P ISOMERS)	1210			3.0E+02	1.00	1.00						X	X	
ZINC AND COMPOUNDS	7440-66-6			3.5E+01	1.00	1.00	X						X	
										SUMMATION FOR ALL TOXICANTS				
										PRIMARY TOXIC ENDPOINT				

NOTES:

1. Multipathway factors are the ratio of the total risk to inhalation risk. These have been developed using HRA92, version 1.1, a multipathway exposure model developed jointly by the California Air Resources Board and the Office of Environmental Health Hazard Assessment. Assumptions and parameters used to develop the the multipathway factors include:
   - Emission rate = 1 g/s
   - X/Q = 1
   - Deposition velocity = 0.02 m/s for controlled sources and 0.05 m/s for uncontrolled sources
   - 70-year exposure
   - Fraction of homegrown fruits and vegetables consumed = 10%
   - Pathways/sources include inhalation, ingestion of soil (pica), homegrown vegetables, mother's milk (for one year) and skin contact.
2. A multipathway factor of 1.00 should be used to calculate the non-cancer chronic hazard index for the respiratory endpoint.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.

Table L-11. Non-Cancer Acute Health Hazard Index Worksheet

DIRECTIONS:

1. Select source description scenario number (from Table below) which best fits facility exit characteristics:
2. Select (circle) either Rural or Urban mode to fit locality: RURAL or URBAN
3. Select X/Q values (below) for source description and mode.

Source Description			Max X/Q in lb/hr		Max X/Q in lb/mo	
No.	Stack Height (feet)	Exit Vel. (fps)	Rural	Urban	Rural	Urban
1	25	30	110	122	0.046	0.051
2	30	30	41	86	0.017	0.036
3	25	75	35	58	0.014	0.024
4	30	75	19	41	0.008	0.017
5	25	Raincap	1603	667	0.667	0.278
6	30	Raincap	711	324	0.296	0.135
7	Fugitive	Fugitive	19918	14626	8.287	6.085

4. Transfer appropriate X/Q values and emission rates into table below. Use the monthly X/Q value and maximum monthly emission rate (lb/mo) for lead only.
5. Identify source as controlled or uncontrolled: CONTROLLED or UNCONTROLLED
6. For each toxicant, multiply emission rate, and X/Q. Divide that product by the REL for each toxicant. List product as Acute Health Hazard Index.
7. Sum Hazard Index for each toxicant and record in summation box.
8. Compare sum to District's acceptable criteria. If summation exceeds 1, sum individually for each toxic endpoint and record maximum endpoint and endpoint-specific HHI. If value exceeds 1, a refined risk assessment should be considered.

CHEMICAL NAME	CHEMICAL ABSTRACT NUMBER	EMISSION RATE (lb/hr) (lb/mo for lead)	X/Q (ug/m3 per lb/hr)	TOXICITY DATA FOR ACUTE EVALUATIONS						ACUTE HEALTH HAZARD INDEX
				ACUTE REL (ug/m^3)	TOXIC ENDPOINT OR TARGET ORGAN: CNS/ PNS	IMMUN	REPRO/ DEV'L	RESP	EYE	
COPPER AND COMPOUNDS	7440-50-8			1.0E+01 [1.0E+2]				X		
ETHYLENE GLYCOL (MONO)BUTYL ETHER (BUTYL CELLOSOLVE, 2-BUTOXYETHANOL)	111-76-2			1.5E+03 [5.5E+3]			X	X		
ISOPROPANOL	67-63-0			[4.9E+4]				X	X	
LEAD AND COMPOUNDS	7439-92-1			1.5 (2)	X					
METHANOL	67-56-1			[2.8E+4]	X					
METHYLENE CHLORIDE	75-09-2			3.5E+03 [8.3E+4]	X					
METHYL ETHYL KETONE	78-93-3			[1.2E+4]				X		
NICKEL AND NICKEL COMPOUNDS	7440-02-0			1.0E+00 [3.3E+0]		X				
STYRENE	100-42-5			[2.2E+4]				X	X	
TOLUENE	108-88-3			[3.7E+4]				X		
XYLENES (M,O,P ISOMERS)	1210			4.4E+03 [2.2E+3]				X		
				SUMMATION FOR ALL TOXICANTS						
				PRIMARY TOXIC ENDPOINT						

NOTES:

1. Values in brackets [ ] are proposed and are for informational purposes. Several of the revised acute RELs are higher than the previous values meaning that the acute HHI for the chemical will decrease. The numbers are not official until after Scientific Review Panel review and adoption by OEHHA.
2. Lead should be evaluated as a sub-chronic or 30-day exposure.

References: CAPCOA 1993 and OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: Evaluation of Acute Non-Cancer Health Effects, Draft for Public Comment, December 1994.